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In the Supreme Court of the United States.

OCTOBER TERM, 1906

Office Supreme
FILE
APR 2
JAMES H.

No. 8 Original.

THE STATE OF KANSAS, COMPLAINANT,

vs.

THE STATE OF COLORADO, THE GRAHAM DITCH COMPANY, ET AL., DEFENDANTS.

THE UNITED STATES OF AMERICA, INTERVENOR.

BRIEF OF THE DEFENDANT THE GRAHAM DITCH COMPANY ON FINAL HEARING.

C. C. GOODALE,
Solicitor for the Defendant,
The Graham Ditch Company.

THE SMITH-BROOKS PRESS, DENVER

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1.

The Graham Ditch Company, one of the defendants in the above entitled cause, for itself alone, in answer to the brief of complainant on the final hearing of this cause, adopts and refers to the brief of the defendant, the state of Colorado, as its answer to complainant, on the general questions involved in this controversy, deeming it unnecessary to take up the time of this court or to burden it with a restatement of the arguments set out so fully and explicitly

in the brief of the said defendant, the state of Colorado.

There are, however, certain facts and circumstances connected with this defendant, relative to its right to a prior use of the water of the Arkansas river, for domestic and irrigation purposes, as against the complainant and those it claims to represent, that we wish to call the court's attention to, so that in the event that it sees fit to countenance the contention of complainant as to its claim to riparian ownership of the waters of the Arkansas river, that in the adjudication of the matter this defendant should be decreed a prior right to the use of sixty-one (61) cubic feet of water per second of time for domestic and irrigation purposes against complainant and those it represents.

2.

The evidence relating to this defendant will be found on pages 977-8-9 of the printed transcript of record, and is not controverted by the complainant. This testimony, together with "Exhibit I," offered and received in evidence without any objection, shows that The Graham Ditch Company is owned by the estate of James Graham, deceased; that its ditch has a physical carrying capacity of sixty-one cubic feet of water per second of time, and a decree for sixty-one (61) cubic feet of water under the adjudication of priority rights to the use of water for domestic and irrigation purposes in district No. 67, under the laws of the state of Colorado; that there are 2,680 acres of deeded land and 440 acres of leased land under this ditch and irrigated therefrom belonging to said estate of James

Graham, deceased, on which crops of alfalfa, wild hay, wheat, or any kind of small grain, sugar beets, etc., can be raised by irrigation, and none of them without irrigation could be grown on these lands.

On page 188 of its brief complainant alleges:

> "The defendants do not appear in this case, either in their answers or in the evidence adduced by them, as riparian owners along the Arkansas river, having full riparian rights and demanding a reasonable and equal amount of these waters under the common law doctrine."

Complainant is in error as far as this defendant is concerned, as a reference to pages 39, 40 and 41 of our answer will disclose. This defendant there alleged as follows:

> "That while defendant avers and alleges that it is entitled to a priority to the use of sixty-one (61) cubic feet of water per second of time by reason of appropriation and of the decree of the District Court, as aforesaid, as against plaintiff and all others, as an additional and further defense it alleges that it is entitled and has the right to the use of said sixty-one (61) cubic feet of water per second of time as a prior riparian right as against plaintiff and those whom it represents, for the reason that the natural rainfall in the vicinity of said tract of land is slight and insufficient for the growing and maturing of

crops, fruits and vegetables, and that the value of the above described lands for farming purposes depend entirely upon their being irrigated. That said lands occupy a part of and are adjacent to the bed of the said Arkansas river upon the south side, of seven (7) miles, and are riparian lands. That it is absolutely necessary, and said lands reasonably require the use of said sixty-one (61) cubic feet of water per second of time to properly irrigate them so that crops, fruits and vegetables can be raised thereon. That said sixty-one (61) cubic feet of water per second of time used upon said lands for irrigation and domestic purposes does not exhaust the entire flow of the stream of water in the Arkansas river, and what is not necessarily consumed for irrigation and domestic purposes upon said described lands is returned by defendant to the said Arkansas river before it leaves the lands owned by the estate of the said James Graham, deceased. * * *

"That this defendant's said described riparian lands are situated on the Arkansas river, higher up and above the lands owned by plaintiff and the other owners of riparian lands upon the Arkansas river in the state of Kansas, to which the plaintiff refers in its bill of complaint."

It will thus be seen that as far as this defendant is concerned, complainant is in error as to its allegation above refered to, for in both our answer and in

the evidence adduced on our behalf, we have made the claim of riparian ownership as against complainant and the other owners of riparian lands in the state of Kansas. Not only have we made the claim but the evidence adduced clearly sustains the question of the riparian ownership of this defendant, and a reference to the replication of the complainant to this defendant's answer will show that there is no denial of these allegations, which consequently must be taken as admitted; while a reference to "Exhibit I," reproduced in this brief, will enable the court to see at a glance the lands belonging to this estate, the Graham ditch, their relation to the Arkansas river and their riparian character.

In 3 Farnham on Waters, 1903, it is said:

> "It would seem, therefor, that any person owning land which abuts upon or through which a natural stream of water flows is a riparian proprietor, entitled to the rights of such, without regard to the extent of his land, or from whom or when he acquired his title. The fact that he may have procured the particular tract washed by the stream at one time, and subsequently purchased lands adjoining it, will not make him any the less a riparian proprietor, nor should it alone be a valid objection to his using the water on the land last acquired. The only thing necessary to entitle him to the right of a riparian proprietor is to show that the body of land owned by him borders upon a stream. This being established, the law

> gives to him certain rights of the water, the extent of which is limited and controlled less by the area of his land than by the volume of water and the effect of its uses upon the rights of the other riparian proprietors. By virtue of the ownership he is entitled to a reasonable use of the water, which is defined as 'any use that does not work actual, material and substantial damage to the common right which each proprietor has, as limited and qualified by the precisely equal right of every other proprietor.' "

This law is quoted with evident approval by complainant on page 186 of its brief, and a glance at "Exhibit I" of this defendant will show that its lands not only border and abut on theArkansas river, but that the river flows through certain portions of its lands, thus making it a riparian proprietor without any question. It will also be observed that the Graham ditch which conveys the water which is used for irrigation and domestic purposes on the tract of land owned by this defendant, does not give the water another direction from what it flows in the river, that for the greater distance it runs on the lands of its owner, and that it returns the water to its ordinary channel when it leaves the estate, thus complying fully in every particular, with the requirements of what is necessary to constitute riparian ownership.

As before stated, we allege in our answer that these lands on which this water is diverted are arid lands on which no crops could be grown without irrigation, and the testimony taken, which is not con-

Map of

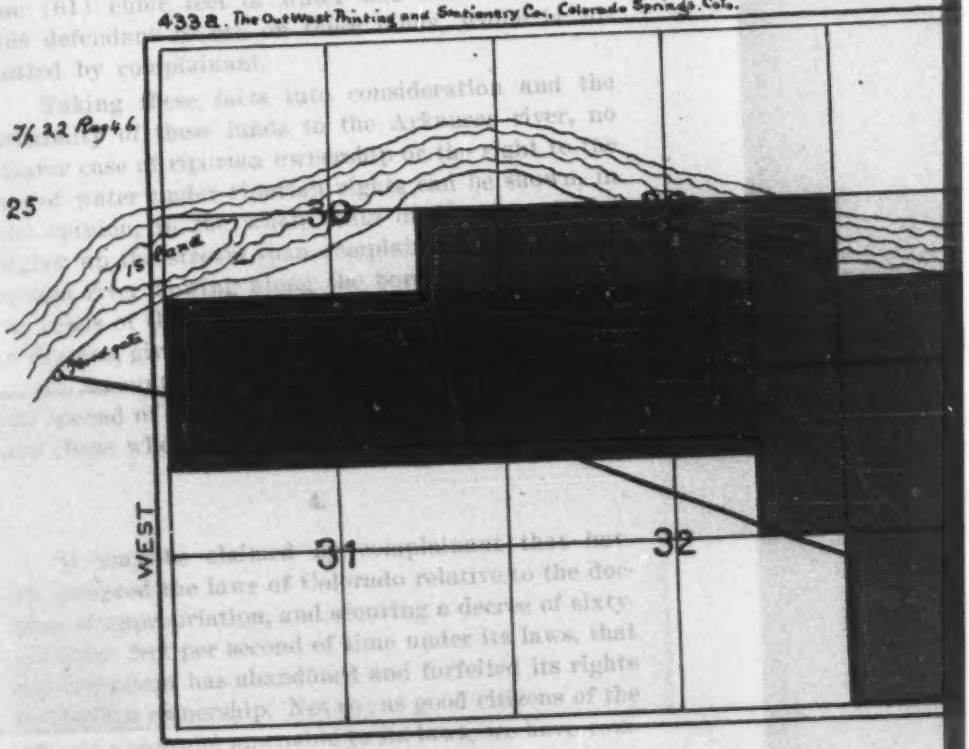
The Estate of James Graham

Township No. 22

EXHIBIT 1.

Pt

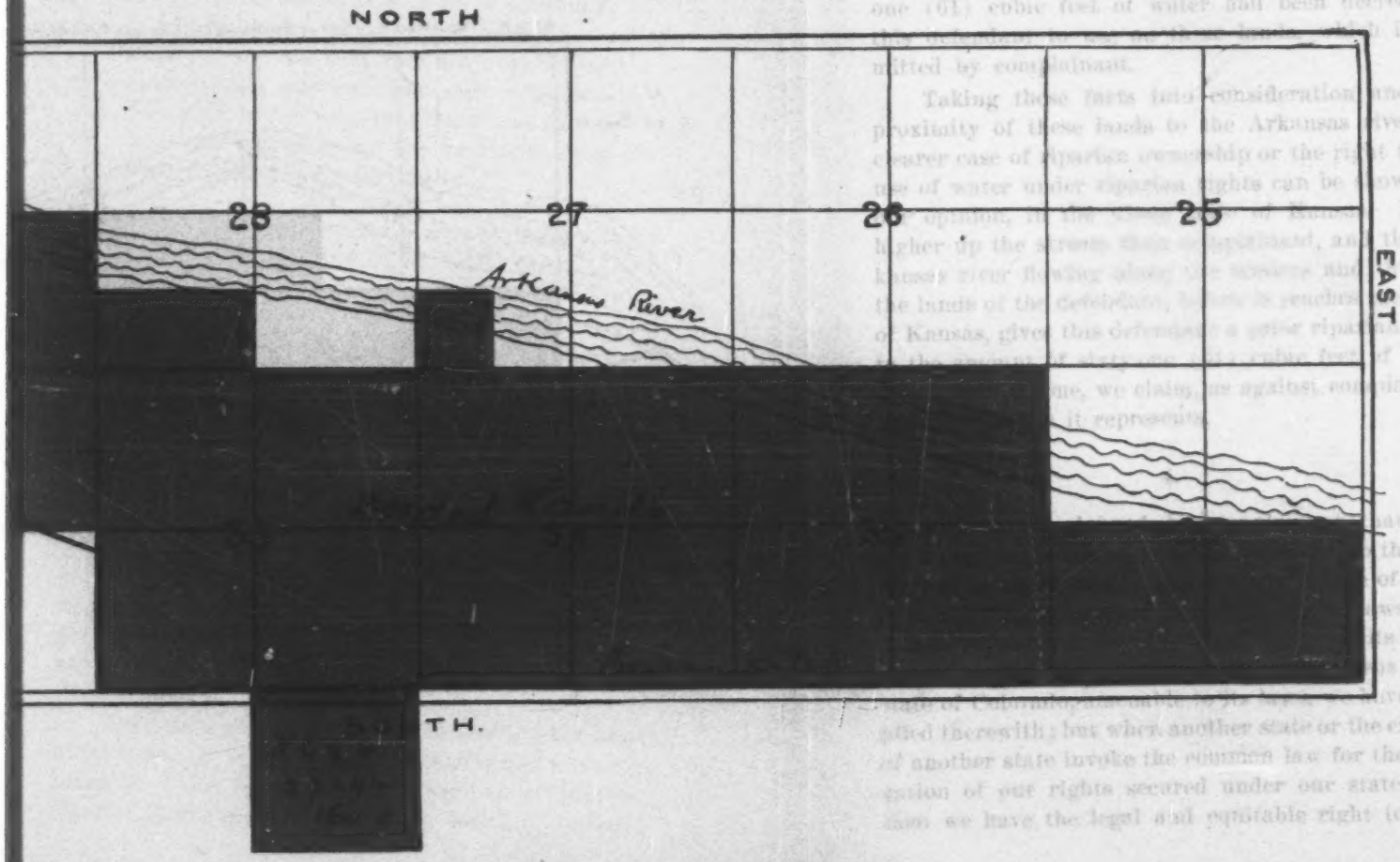
4338. The Out West Printing and Stationery Co., Colorado Springs, Colo.



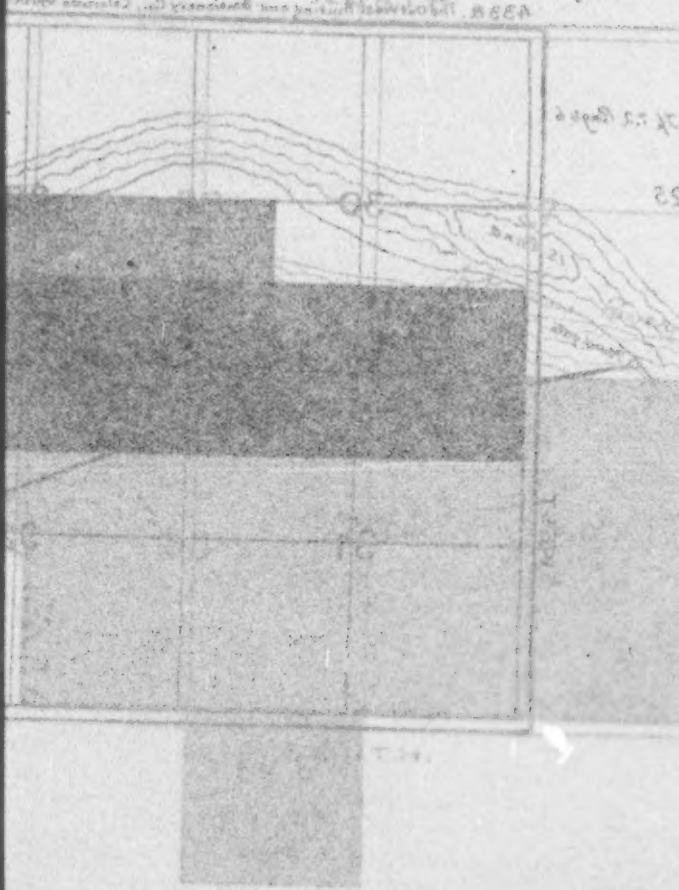
Map of Graham Ditch and Lands under same belonging to
Mason deceased

22 Range 44 West of the 6th Principal Meridian.

Prowers COUNTY, COLO.



Deeded Land 2680 Acres
Leased Land 556.37 .



tradicted, so shows; that sixty-one (61) cubic feet of water per second of time is necessary to properly irrigate said lands so that crops, fruits and vegetables can be raised thereon, which is not denied; that under the laws of the state of Colorado sixty-one (61) cubic feet of water had been decreed to this defendant to use on these lands, which is admitted by complainant.

Taking these facts into consideration and the proximity of these lands to the Arkansas river, no clearer case of riparian ownership or the right to the use of water under riparian rights can be shown, in our opinion, in the whole state of Kansas. Being higher up the stream than complainant, and the Arkansas river flowing along the borders and through the lands of the defendant, before it reaches the state of Kansas, gives this defendant a prior riparian right to the amount of sixty-one (61) cubic feet of water per second of time, we claim, as against complainant and those whom it represents.

4.

It may be claimed by complainant that having accepted the laws of Colorado relative to the doctrine of appropriation, and securing a decree of sixty-one cubic feet per second of time under its laws, that this defendant has abandoned and forfeited its rights to riparian ownership. Not so; as good citizens of the state of Colorado, amenable to its laws, we have complied therewith; but when another state or the citizens of another state invoke the common law for the abrogation of our rights secured under our state laws, then we have the legal and equitable right to refer

to the same common law that they have invoked, showing that under that law our right to the use of this water for irrigation and domestic purposes is superior to the rights of those who hale us into court and contest our right under the same law. They are certainly bound to abide by the provisions of the law, under which they claim certain rights, so far as *they* are concerned in Colorado as well as in Kansas.

5.

Much abler minds than the writer's have taken up in this case the question of appropriation of waters for domestic and irrigation purposes in this state, secured to the citizens of this state by its Constitution and its laws, by which an empire is being builded up in the Arid West embraced within the limits of this commonwealth, transforming the great plains which a few decades ago were covered with sage brush, cacti and the sparce buffalo grass, into green fields of alfalfa, winter wheat and the other small grains grown in a temperate climate, vast fields of sugar beets, whose product is being converted into sugar by great factories in towns along the banks of the Arkansas river, where a decade ago the only town was that of the prairie dog; where thousands and tens of thousands of people are living in happy homes, surrounded by all the comforts of life, enjoying the glorious sunshine and climate of this great state of Colorado, rearing manly men and womanly women, to take part in the matters and interests of this great nation, giving it strength and character, and which if it had not been for this doctrine of appropriation would still have been the home of the coyote, the

prairie dog and the lonely owl—given over to desolation—and would still be marked on the geographies of the youth of this nation, as it was when the writer was young, "The American Desert."

If our brethren in Kansas will only be patient, we will in a few years return to them the great Arkansas river not as a river whose floods carry destruction along its borders, but as a steady flowing stream full to the top of its banks, a mighter and better river to them than civilized man has ever known it to be. The past five years, as shown by the evidence, is demonstrating that fact, and the inhabitants in the western part of Kansas bear witness in the testimony adduced to the fact that this river is getting a greater, steadier and better flow as each year goes by, caused by the return waters from irrigated lands in Colorado coming back to the stream and flowing down to our brethren in Kansas for them to utilize as they deem best. For the irrigation of the lands in Colorado is simply the same as storing the water in a reservoir, which, every day experience shows, is returning in greater volume each year lower down the stream.

CONCLUSION.

In our presentation of this matter we have been brief and concise, for "Exhibit I" shows fully our claim to riparian ownership, and we respectfully pray to this court that as this defendant belongs to the estate of James Graham, deceased, the real defendant in interest, it being the estate of one of the early pioneers of this part of the Great West, James Gra-

ham, who settled here when the Cheyenne Indian claimed this part of the West as his home, and through dangers and difficulties that would have discouraged a less dauntless and courageous character, made it his home and accumulated the lands described in this defendant's answer, built the Graham ditch and transformed the barren desert into great fields of alfalfa, vegas of natural hay, and good pasture for his herds of cattle, that it seems that the rights of his heir be protected in the final adjudication of this case, by granting to this defendant a prior and superior right to sixty-one (61) cubic feet of water per second of time, as against complainant and those whom it represents, and for such other relief as to this court may seem equitable and right in the premises.

Respectfully submitted,

C. C. GOODALE,
Solicitor for the Defendant,
The Graham Ditch Company.

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O.T. 1906

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PRELIMINARY STATEMENT.

It would seem unnecessary at this time to restate in detail the issues in this controversy. The court is already familiar with them. But as a basis for discussion, the nature of the contention may be briefly set forth.

The Arkansas river rises in the Rocky mountains in the State of Colorado; flows southerly and easterly through the State of Colorado and into the State of Kansas; thence, when not lost in the sands, it flows in a general easterly and southerly course to the southern boundary of the State of Kansas; and thence on to a junction with the Mississippi river.

In recent years divers corporations and citizens of Colorado have, by means of canals or ditches, diverted water from the Arkansas river in Colorado, and applied such water to beneficial uses upon what were arid lands, within the valley of the Arkansas in Colorado. As a result of irrigation by the waters of the Arkansas, what was an arid waste, almost uninhabited, has become covered with productive farms and gardens, supporting a large population of energetic and prosperous people. Large towns have grown up and great industries have been established.

The State of Kansas, however, now complains of this diversion and use of the waters of the Arkansas in Colorado, and claims that the stream should be permitted to flow, "as it was in former times accustomed to flow." It alleges great injury to the people of the State of Kansas, by reason of the diversion of the waters from the Arkansas in Colorado, and it asks that this court shall enter a decree prohibiting the State of Colorado from permitting any diversion of the waters of the Arkansas river, or of any of its tributaries, from their natural beds, courses and channels within the State of Colorado, except for domestic use, and that it shall be prohibited from permitting any one to construct, maintain and *operate* any canals, ditches, trenches, laterals or reservoirs *now in use* in said state. It also asks that this court will, by its decree, prohibit and enjoin all the defendants from operating either directly or indirectly any canal or ditch, whereby the usual and ordinary flow of the waters of the Arkansas river, or any of its tributaries, shall be diverted from their natural courses and channels, and from operating or using any reservoir for the storage of the usual and ordinary flow waters of said

river, or of any of its tributaries, for the purposes of irrigation, sale or merchandise.

It will be observed that if the prayer of the complainant should be granted as asked, it would mean the destruction of millions of invested capital, the driving out from their homes of a large population of industrious people, and the return of a large, rich and productive territory to a condition of arid desolation. This demand on the part of the State of Kansas is based upon the alleged fact that the diversion of the waters of the Arkansas for the purpose of irrigation in Colorado has seriously injured the people living within the valley of the Arkansas in the State of Kansas, the nature of such alleged injury being set out at length in the bill of complaint.

The contention of the defendant, State of Colorado, as to the facts, may be concisely stated as follows: The Arkansas river, popularly so-called, is substantially two rivers, one a perennial stream rising in the mountains of Colorado and flowing down to the plains, and this *Colorado* Arkansas, when the river was permitted to run as it was accustomed to run, prior to the period of irrigation, poured into the sands of western Kansas, and at times of low water the river as a stream entirely disappeared. Its waters were to some extent evaporated, and as to the residue, were absorbed and swallowed up in the sands. So that from the vicinity of the state line between Kansas and Colorado on eastwardly, as far, at least, as Great Bend, if not farther, at such times of low water there was no flowing Arkansas river. Farther east, however, a new river arose, even at such times of low water, and partly from springs, partly from

the drainage of the water table of the country supplied by rainfall, and partly from the surface drainage of an extensive territory, this river gradually again became a perennial stream, so that south of Wichita, and from there on to the mouth of the river, the *Kansas* Arkansas, as a new and separate stream, had a constant flow. Such, as the river was accustomed to flow, was the Arkansas of the period prior to irrigation. It was a "broken river." It is true that at all times in early years, and now, the Arkansas river at times of flood, or of what might be called high water, has a continuous flow from its source to its mouth, but a flow, even in times of flood or high water, which diminishes through the sandy waste east of the Colorado state line above described, so that oftentimes even a flood in Colorado would be completely lost before it had passed over this arid stretch of sandy channel, and high water would always be diminished in flow through the same stretch of country. This river is as if it were a current of water passing over a sieve; if the current be slow and the volume not excessive, all of it sinks through the sieve and none passes on beyond; when the current is rapid and the volume is large, still a large amount sinks in the sieve, and the residue passes on beyond.

Now, the irrigators of Colorado have confined their actions to the *Colorado* Arkansas above described. They have taken the waters of the perennial stream before it reaches this sieve, through which it wasted; they have lifted that stream out of the sandy channel in which it had flowed and applied it to beneficial uses upon the land; carried the body of it along at a higher level than where it was accustomed

to run, and they finally restore it, practically undiminished in volume, so far as regards practical use, at points in the ancient channel farther east than the river at low water was accustomed to flow before the period of irrigation. The effect of the diversion of this water in Colorado, the carrying of it forward on a higher level, the return of waters partly through seepage and partly through direct delivery at waste gates, and the effect of this process in extending eastwardly the perennial flow, will be fully discussed in the course of the argument to follow. It is sufficient in this preliminary statement to say, that it is admitted by the complainant that in the course of a twelvemonth there is a vast amount of high and flood waters of the Arkansas that are never captured by man, that are of no use, but are, rather, of injury to Kansas riparian proprietors, and, so far as any beneficial use is concerned, are absolutely wasted and lost. Kansas does not claim that she has not abundance of water in times of flood, or in times of high water; her complaint is based upon the alleged fact that she does not have what she was accustomed to have in periods of low water, whereas, in fact, as contended by the State of Colorado, the diversion of water in Colorado into ditches and reservoirs, continuing, as it does, throughout the year, in times of flood and in times of high water, has the effect, through seepage and return waters, to give perennial vitality to portions of this stream during what would otherwise be periods of depression or suspension of flow.

Naturally, the first inquiry to be made in this discussion is, Has Kansas, or have its people, been in-

jured by the diversion, for purposes of irrigation, of the *Colorado* Arkansas? If, in fact, the people of Kansas have not been injured, then, without further inquiry into either the facts or the law of this case, this bill of complaint should be dismissed, for it is only on the ground of a substantial injury, as a result of the action of the defendants, that this case can for a moment be sustained. If it is a case where the damages are but nominal, or are trivial in their extent, as compared with the vast interests involved in the demand made by the complainant, then this case should be dismissed. We shall, therefore, before entering upon a discussion of the various other interesting propositions of fact and law which the record presents, first consider whether, in the light of the evidence submitted, Kansas is really a sufferer by reason of any act complained of.

ARGUMENT.

I.

KANSAS HAS SUFFERED NO INJURY.

The learned counsel for the complainant, at page 184 of their brief, make an eloquent summary of their contention as to facts. They say, in conclusion:

> "As a direct and proximate result of the diversion of the waters of the Arkansas river in Colorado by the defendants, the navigability of the river above Fort Gibson has been destroyed; the natural and normal flow of the river has been materially decreased; the underflow has been lowered, until it is no longer valuable for maturing crops and fruits in the Arkansas valley, *greatly lessening the yield per acre* and the *value of the lands.* The water power at Arkansas City has been greatly injured. The irrigation ditches in western Kansas have been deprived of their water supply, of long prior appropriation, leaving them *ruined,* the lands *deserted,* and the *resulting industries* and *prosperity almost extinguished.* The revenues of the State of Kansas have been materially decreased, and the *general prosperity of a vast region,* and of a considerable popula-

tion, *has been impaired beyond computation* or any measure of exact definition."*

This is a picture of sad desolation, but it is as seen by one who looks through a glass darkly. If we turn upon the picture the bright sunlight of the evidence in this case, its dark and forbidding aspect will suddenly change, and instead of the picture here depicted, we shall see a radiant panorama of prosperity.

We shall leave, for the present, the specific matters of limited scope referred to, such as the navigability of the river and the injury to a certain water power at Arkansas City, and consider for a little while the broader aspects of the situation presented in this picture drawn by the counsel for Kansas. It might, however, in passing, be suggested that we have in this very statement a peculiar departure from the contentions of the bill of complaint. We now find as an affirmative ground of assault on Colorado that *irrigation ditches* of Kansas have been deprived of their water supply, and yet this suggestion is urged by a complainant that is distinctly contending that water should not be taken out of the stream for any purposes of irrigation, but that the stream should be permitted to flow, *ut currere solebat,* undiminished in quantity. So many of the witnesses for the State of Kansas were found to be interested in supporting the doctrine of appropriation of water for beneficial uses, as against the strictly riparian doctrine, that the

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*The italics are ours, wherever they occur in this argument.

State of Kansas, as complainant, finds itself riding at the same time two horses going in different directions. For the people of eastern and southern Kansas it must contend that all the water, undiminished in quantity, should be permitted to flow as it was accustomed to flow; for the people of western Kansas it must contend that the water should be permitted to flow *to them,* in order that *they* may *divert it from the channel* and utilize it in plans of irrigation for Kansas lands. Without commenting further, however, at this stage, upon the inconsistency of the complainant's position, let us see whether, in that which constitutes the real gravamen of the charge against the defendants, Kansas has suffered any injury.

1. Out of the mouths of the witnesses produced by the State of Kansas we shall find abundant answer to the inquiry.

M. M. Murdock, of Wichita, the first and principal witness for the complainant, and the man who, above all others, has worked up this case, tells us:

> "The lands are worth as much in the Arkansas valley to-day as they ever were, on an average, but probably would not sell for quite as much, that is, except during our boom times. But aside from boom times they are worth as much as ever. * * * Of course values here are growing, because we are a growing community." (263.)*

*Throughout this argument figures in parentheses, following citations of evidence, refer to pages of the printed transcript of record.

C. E. Tupper, of Mount Hope, Kansas, speaking for the complainant, says:

> "I guess my average corn crop for the last twelve or fifteen years has been about thirty-five bushels to the acre, on the average. The market value of the land is probably more now than formerly. It isn't any less, anyhow." (285.)

D. E. Breese, of Wichita, says:

> "The general effect of the value of lands here as the years have proceeded has been that land is worth more money now. Prices have gone up all over. There has been a general rise all over the country. There hasn't been much change in price for several years in Sedgwick county. The first bottom lands are the more valuable."

Further on he says:

> "The land has not doubled in value here in the last twelve years. I think it has increased fifty per cent." (297.)

G. M. Shive, of Wichita, says:

> "Land is worth more now than in 1885. Outside of boom periods, I think land is worth a little more now than formerly. I do not desire to sell my land. I am perfectly satisfied with it; I think it is a pretty good investment." (301.)

J. W. Shive says:

"There has been no time prior to four years ago when land has been any higher than it has been for the last four years in my locality. In the main there has been a steady increase in farming lands in that section of the country. The increase of value was faster at some times than others. Sometimes it would be at a standstill, as it is now, and then it would advance again from some cause. In the last five years the values have gone up considerably. The increase has been about twenty-five per cent. in the last six years. This covers the bottom lands generally along the Arkansas river, and there has been a corresponding increase in second bottom lands or uplands. In some instances grazing lands have advanced more than farming lands in that time."

Further on he says:

"Since 1890 we have never had a total failure of crops." (315.)

R. E. Lawrence, of Wichita, says:

"The valley, on an average, from Wichita to Hutchinson, will vary from seven or eight miles to twenty-five miles in width. It will perhaps average fifteen miles. It is very productive land." (319.)

The same witness says:

"Farms near Wichita have been sold as high as a hundred dollars an acre. They were sold this year. I remember one or two farms up between the rivers that sold last spring for one hundred dollars an acre; but generally where they are a little farther back from town, and with fair improvements, bottom lands are worth at least fifty dollars an acre, with good, fair improvements. I expect it would be pretty difficult to buy a farm within ten or fifteen miles of Wichita at less than fifty dollars an acre, with good, fair improvements. I think lands are advancing in value. That is true of all land." (331.)

B. H. Campbell, of Wichita, on cross-examination, says:

"I should think there has been a constant influx of farmers along the Arkansas valley from 1878 up to the present time, and more and more land brought under cultivation." (337.)

C. P. Fullington, of Wichita, says:

"Some of the lands in the western part of the state have increased in value. I can not name a locality where they have decreased. There are localities where there is some demand for land at a price where previously there was no demand at all, and then again there are localities where there is con-

siderable land at a very much increased price. The net result is an increase in the value of the land." (344.)

Hiram W. Lewis, of Wichita, says:

"The average of farm lands from seven or eight miles to twenty miles from town, with good, fair improvements, is from thirty to fifty dollars an acre. We have all kinds of farmers here—good farmers and poor farmers. *I have never heard any complaint in reference to crops from our best class of farmers.*" (353.)

A. B. Caldwell, of Wichita, says:

"The crops throughout the part of the Arkansas valley with which I am acquainted are very much more diversified now than they were twenty-five years ago. There are many crops raised here that could not be raised twenty-five years ago. Considering the value of the crops, the lands in the Arkansas valley with which I am familiar are much more productive in dollars and cents than they were 25 years ago." (358.)

This witness further states that there is nearly double the amount in cultivation in Reno county than there was fifteen years ago, and when asked the question whether, considering the diversity of crops, the land is just as valuable from a productive standpoint as it was fifteen years ago, he answers, "yes, sir." (359.)

And, later on in his examination, he says:

"I should say that those lands have been as high in value for the last five years as they ever were for any five-year period since I have known the country." (361.)

Albert H. Denton says:

"I think the values of bottom farming lands along the Arkansas river in this county were higher than they were fifteen or twenty years ago. There has been a steady and general increase in values, I think." (395.)

R. E. Edwards, of Kinsley, tells of an increase of fifty per cent. in the amount of lands used for farming purposes in the last twenty years in his county. (431.)

And he says:

"The value of my bottom lands in Edwards county, on the Arkansas river, are as high now as they ever have been. They have increased gradually during the last twenty years with the settlement of the country. There has been more or less increase in the last ten years, not only in bottom lands, but all lands—lands everywhere."

He also says:

"I was about to say that the largest crop of wheat I have ever known here was raised

in 1877 or 1878, but that is not true. There was some here *last year* that was as high in production as ever known. In 1903 there was a crop of wheat down below here of twelve acres, that went 52 bushels to the acre. The average wheat crop on the bottom last year was good." (433.)

B. D. Baxter, of Kinsley, Kansas, a county clerk of Edwards county, gives the acreage in alfalfa, wheat, corn and oats, respectively, in years, from 1886 to 1904. The acreage in wheat was three times as much in 1904 as it was in 1894. The acreage in corn was nearly twice as much in the later year as in the earlier, and the acreage in alfalfa was fifty per cent. greater in 1904 than in 1894. (440.)

Robert N. Wright, of Dodge City, says:

"They are cultivating more land, and with the exception of this year, they have raised better wheat than they have heretofore. But this year the rust struck it. The values of land here are generally higher than ever before. They have been steadily increasing year after year for twenty years, with the exception of the fluctuation by reason of booms and their subsidence." (450.)

H. B. Bell, of Dodge City, says that the acreage in new ground in crops in the last fifteen years has increased from twenty-five to thirty per cent., and this witness, produced by the State of Kansas, says:

"Alfalfa is a more profitable crop than native hay. Where I have noticed alfalfa on the first bottoms, the crop is generally good. I have never noticed that the water has sunk to a greater depth below the surface than it was formerly." (474.)

On the next page this witness says:

"I think alfalfa lands are worth about $30.00 an acre—from $20.00 to $50.00 an acre—and the native grass lands about $10.00 an acre. Twenty years ago there was not any crops raised or planted. The country has been very successfully farmed of late years—more profitably of late years than before." (475.)

F. L. Pierce, of Garden City, says:

"I am probably raising as good crops as I was seven years ago, and the land is worth every bit as much to the acre as it ever was. It is worth a little more. The lands of my neighbors have not depreciated. This year the crop has been a failure on account of the grasshoppers." (546.)

I. L. Diesen, of Garden City, says that lands are as valuable at this time as they have been at any time in the history of the country. (578.)

C. S. Longstreth, of Garden City, says:

"This farm of mine is worth as much on the market to-day as it ever was except in

boom times. I don't think anybody has money enough to buy it. It is there permanently. It is not for sale. It suits me all right." (588.)

All of the foregoing, it will be observed, is taken from the testimony of witnesses produced for the State of Kansas in the original submission of their case. It represents the opinion on the subject of values and crops of those upon whom the plaintiff is especially relying to make its case.

After the defendant had introduced its evidence the plaintiff, State of Kansas, brought forward a number of witnesses in "rebuttal." Their testimony is almost exclusively of a purely cumulative character. The defendants have made a motion to strike it out from this record. It seems proper, however, in advance of any consideration of that motion, in further elucidation of the subject now under consideration, to call the attention of the court to what these witnesses say about the land values, crops and general prosperity.

Counsel for the State of Kansas, at page 155 of their brief, speak of the incalculable loss of the state itself, in its revenues collected by taxation, because of the lower assessed valuation of these valley lands. The very statement seems somewhat grotesque, in view of the evidence of Kansas witnesses, already cited. But the brief of the State of Kansas proceeds to say that this loss to the state and to the owners of the property, and this decrease in the assessed valuation, is "very vividly but somewhat sorrowfully shown by the records of the county clerk of Finney

county, where he offered in evidence the assessment rolls of fifteen quarters of land taken at random." This list of assessed valuations, which pertains to only fifteen quarters of land, and in one county, is set forth at page 1862, but it is interesting to note some expressions of the witness who produced these assessment rolls, as disclosed on cross-examination, bearing in mind that his interest is to sustain the testimony which he had produced in chief. The witness, W. McD. Rowan, says:

> "As to whether I know as a matter of fact that lands are higher in this county at the present time than they have been back in 1885 or 1886, I would answer, they may have gotten so in the last few months, yes, sir." (1865.)

Again, he says:

> "Yes, sir, these farming lands are higher now than they were five years ago, but they are very little higher than they were twelve years ago. It has all been done in the last twelve months, is what I want to get at." (1866.)

This witness was a county clerk. The testimony of farmers, who buy and sell lands, and who raise crops, will appear further in the citations following:

James Craig, of Garden City, says:

> "I would say land is as high here as it has been at any time; that is, in our country,

three miles north of town. Yes, sir, I believe it is as high here now as it was during the boom of 1885 and 1886. I believe it is higher around my place there than it was in the boom days. I believe my farm will bring more money to-day; and as a general thing land is now very much higher than it has been in the past, outside of these boom years of which I have spoken." (1893.)

John Riney, of Dodge City, says:

"My lands are more valuable now than they have been in the past. Yes, right now they are of more value, and I hold them higher than at any other time since I located there." (1908.)

The same witness says:

"I first commenced to raise alfalfa fifteen years ago, and I have gradually increased the acreage, and it is about as profitable as any acreage right now at the present time. I expect it brings, ordinarily, $5.00 or $6.00 a ton." (1910.)

Charles H. Northrop, of Dodge City, says that the value of lands in the valley are now rated at twenty-five to one hundred dollars an acre, and that in 1894 you could have bought the same land at from ten to fifty dollars an acre. (1933.)

P. H. Young, of Dodge city, says:

"As to the values of land here now, compared with what they were in the earlier

years, I would say they are decidedly better. I guess that would hold good as a whole. Of course they are considerably better than they were during the '90s, but for a period before that they were also higher, and after that. Outside of any boom time the value of farming land, both valley and upland, is better." (1962.)

The same witness had indicated that the hay land was less productive than formerly, but he says:

"Yes, sir, notwithstanding what I say about the productiveness of the hay lands, they are worth as much to-day along this river as they have been at any time in twelve years." (1968.)

S. S. Dickinson, of Larned, says that his land is worth now more than it used to be, and adds:

"I have never known a time when it was worth any more on the market than it is now. Land values are higher here than they were. Alfalfa is a more productive crop, in dollars and cents, than wild hay. Good alfalfa land is worth more than wild hay land." (1995.)

The same witness further on says:

"I live about 800 feet from the river. I have 2,000 bearing apple trees, over twenty-five acres. Yes, sir, I raise a good crop of apples there, generally speaking. *I have never had a failure.* That orchard was

planted in 1891, and part of it in 1886, and is a pretty good bearing orchard yet, yes sir." (2011.)

Clyde B. Johnson, of Larned, says:

"Times used to be different in this country, and we used to make a living any way we could, and we used to live a good deal on catfish in those days. Yes, sir, the people are a *good deal more prosperous now than formerly.*" (2013.)

William A. Heller, of Larned, says:

"Land is higher and everything else. As to whether one can raise a great deal better crops of late years than you could twenty years ago, on an average, I would say no; I don't believe we raise any better crops on an average, only *we raise them oftener;* that is, *they have crops more years. Yes, sir, fewer failures.*" (2018.)

We shall ask the court to refer to the statements of these witnesses when we come to consider the effect of the use of the waters of the Arkansas for purposes of irrigation.

A rather significant statement is made by the witness W. B. Cornell, of Great Bend, Kansas, who had described certain of the lands as being better, but the hay meadows as having been less productive by reason of the lowering of what the complainant calls the underflow. He was asked as to whether the benefits did not offset the injuries. He says:

"I never paid any attention to it. I don't know as it makes any difference to me, as far as I am concerned, individually. As to whether there has really been enough injury in it to attract my attention or for me to take any particular steps or interest in this litigation over the waters of the Arkansas river, I would say, I was interested in it as a citizen of the state, but then *it was all politics to me and I let it go.* I never paid any attention to it." (2031.)

G. L. Chapman, of Great Bend, says that the lands have all raised in valuation. He further says:

"No, sir, they have not depreciated any or gone down along the valley in late years. The valley lands, of course, along the river have always commanded a very good price. No, never any better price than they do now on the open market since I have been here, not that I have any recollection of." (2041.)

Throughout the evidence there is considerable discussion from time to time as to whether the failure to rotate crops and the keeping of land in one crop for a long season of years did not have the effect of wearing it out so as to produce less results.

The witness, T. B. Unruh, of Great Bend, says:

"As to how long we raise corn on some land without changing the crop, I will say we still raised corn in 1890. Well, in 1890 we didn't have any corn. We got mad and quit

raising corn. As to whether we can grow corn fifteen years on land, I will say, well, if you change off, and if you don't change off—well, we have got to do it. Yes, sir, sure we change off. We didn't change off up to 1890. As to whether the land was pretty well worn out in corn by that time, I don't know. Yes, sir, we had been growing it on there for fifteen years, and I suppose growing the same crop on there for fifteen years would wear the land out. Yes, sir, we are raising wheat now on that land. We make more raising wheat than corn. As to whether it is better for wheat now than for corn, I believe it is for both good." (2054.)

J. H. Smith, of Sterling, Kansas, says:

"I think our lands are probably selling higher now than they ever were. * * * I think alfalfa land, well seeded, is as valuable as wheat or corn land. As to how this locality along the Arkansas river is as to general prosperity now, compared with any earlier time I have known it, I would say, *this is one of our most prosperous periods.* I think I have seen it when it was probably a little better, because we were getting, maybe, a little better prices. Our crops have been—*three years ago there was a fine crop. Two years ago there was a fairly good crop. Last year there was a fairly good crop of wheat.*"

Again, on the same page, he says:

"Three years ago we had our bumper crop here, in 1901." (2074.)

This witness is a land owner, and besides being an owner of farming lands, is also a loaner of money, and immediately following our last quotation from his evidence, he further says:

"I don't know whether it is true that the flow of the river through this county was less in 1901 than last year. I haven't observed it at all. No, sir, as a matter of fact, I haven't paid very much attention to the flow of the river or its effect on the country. I try to keep pretty good tab on the crops and the prospects of the people I am dealing with, but I haven't been watching the river flow, and pretty nearly all I know about the narrowing of the stream is simply that I went and looked at it to find out. No, sir, so far as the responsibility of the people is concerned and their capacity to pay, I have not taken into consideration the fact, nor thought it necessary, that the river was a little smaller or a little bigger from year to year. *We have got the best people in the United States, and they have got good farms and plenty of money.*" (2074, 2075.)

H. Swartz, of Sterling, says:

"I never knew the valley lands along the Arkansas river in this locality to be higher

priced or more valuable on the market than they are now, and *I never knew the general condition of this section of the state to be more prosperous than it is at the present time.*" (2079.)

Frank Vincent, of Hutchinson, Kansas, says:

"All of our lands here are increasing in value as compared with any former period within my residence here, and I think *the country is quite prosperous now.* I should say there has been an increase all the while in cultivated uplands in Reno county, and in bringing lands into cultivation." (2091.)

T. A. Bigger, of Hutchinson, says:

"We were much alarmed for a number of years, but we have had good crops in the last six or seven years on an average. Our crops have been very satisfactory. No, I do not remember a time when, for six or seven successive years, we had any better crops than we have had during the last six or seven years, on an average." (2109.)

The foregoing was on cross-examination, and on re-direct examination by counsel for the State of Kansas, this witness further says:

"As to the bottom lands being more productive in corn when the underflow is thirty inches nearer the surface than when that underflow has fallen thirty inches, I will say I

think we have had about as good corn. Our corn crops have not been as good as our wheat crops, you understand. But I could hardly say that the crops have been diminished greatly by that lowering of the depth of the water. As to whether I think that the lowering of the depth of the water has affected the bottom land as to hay, I will say, right here at Hutchinson I couldn't say that it has made any vast difference." (2110.)

George W. Watson, of Hutchinson, speaks of an increase of crops in the country lying west of Kinsley, or even west of Hutchinson, which increase he attributes to the fact that there is an increased number of acres under cultivation, causing an increased amount of water that has evaporated, and an increased humidity in the atmosphere, with resultant increase in average rainfall. He adds:

"It is my claim that whether the statistics would show an increase in the total precipitation or not, the rains are better distributed for crop production, come in a gentler and better form and that there is more humidity in the atmosphere and that the rains come in a better average time."

This witness further says:

"From a line running north and south from Dodge City, and east of that, we feel we are more certain of crops now than we were ten, twelve or fifteen years ago." (2123.)

W. H. Poovey, of Oxford, says that the value of lands have advanced since he located in the country, and he says:

"Yes, farming land has all advanced in this country in the last three or four years. I would consider that it has doubled in the last five years. About one-third. I can't say as to whether this country never before has been as prosperous. We are prospering pretty well here, that is, most of us. I suppose the people are generally *as prosperous now as at any time in the history of the county.* Yes, sir, I believe that the future of this country is bright for the farmers. No, sir, I would not have any hesitation in recommending a friend to locate here and go into the farming business at this time." (2204.)

J. S. Overley, of Oxford, says:

"As to the value of my land at the present time, I should judge it is worth about $50.00 an acre, and it was not much different in value five years ago. Yes, sir, land has improved in this county during the last five years. It has improved some in value. I expect close to one-fourth. No, sir, there has been no time since I located here when lands were higher than they are now. I don't think they have been any higher. I hope the prospects for the future are good." (2213-2214.)

A. P. Doughitt, of Oxford, Kansas, says:

"There has been a more marked increase in the value of farming land, both bottom and upland, in the last four or five years. There have been more buyers around and more demand for the land, yes, sir, and the prices, I think, have gone up accordingly. As to what uplands are worth in this vicinity, I can't answer that question when there is not a foot of land to be sold there, and nobody will set a price on it. I haven't got a neighbor in there that will sell, and I don't know the general value of the uplands. When a buyer comes to a neighborhood and they will not set a price on it, I can't see how I can tell the value of it. As I told you a moment ago, I think the value has increased on the uplands as well as on the bottoms, and I don't suppose you could buy a piece of upland in there at less than $40.00 an acre. I don't think you could buy it for that." (2339.)

The thirty-six witnesses whose testimony is here cited, together with others, were produced by the State of Kansas for the purpose of giving their views as to diminution in the flow of the Arkansas river, and to show that in recent years it is necessary to dig wells at a greater depth than formerly to reach a good supply of water, and to some extent to show that comparatively certain of their lands were not yielding as much per acre now as in former years. And yet here we have at least thirty-six of the number

who testify to a condition of general prosperity, with increased values of lands or growth of crops, and all manifesting the spirit of hopefulness and energy that goes with success in life. How different a picture from that desolate view which the brief of the plaintiff would present to us.

2. This general condition of prosperity, refuting, as it does, the claim of injury to the agricultural interests of Kansas, is emphatically and unanimously sustained by the evidence of numerous citizens of Kansas, brought to the witness stand by the defendant, the State of Colorado; not at one or two points, but all along the Arkansas valley, from the state line of Colorado to the boundary of Oklahoma. We ask the attention of the court to mere references to their testimony.

At Garden City: Larmor (1463-4); Stocks (1476); Hill (1895, 1497).

At Dodge City: Crane (1500, 1501); Evans (1506, 1508); Argabright (1517, 1518, 1520, 1521, 1522); Juneau (1534, 1540, 1543).

At Larned: Lee (1547-8, 1549); Payne (1551, 1552); Schnack (1555, 1556, 1557); Frizell (1558, 1560); Leasure (1567); Brinkman (1571); Thorpe (1576).

At Great Bend: Moses (1583, 1584); Norris (1587); Gibson (1590); Bidleman (1594); L. D. Williams (1596); Rogers (1599); Epperson (1601); Lewis (1604); Tyler (1607); Wilson (1611).

At Hutchinson: Swarens (1617); Welchons (1622); Hadley (1627); Foster (1631); Jewell (1635, 1636); Culberson (1641).

At Wichita: Sprankle (1644); Stevens (1647); Brown (1661); Schaefer (1684); Dofflemyre (1692);

Hall (1704); John Williams (1708, 1711); Winters (1736, 1738); J. W. Sites (1742).

At Winfield: Lemasters (1767); Phillips (1779); Nixon (1782); Hamm (1784); Hahn (1798).

A few selected quotations will serve to illustrate this great mass of testimony:

G. R. Hamm has lived at Oxford, Kansas, in Sumner county, bordering on Oklahoma, since 1878. He says:

> "As to the crops, particularly the corn crops, raised in the first ten years, compared with the same crops raised in the last ten years in the locality in which I live, including my own, I don't believe there is very much difference. Of course there are some years better than others, and we had it that way in the first years and we have it that way in the later years." (1784.)

John Williams, a farmer, has lived for thirty-two years on the Arkansas river, between Wichita and Hutchinson. He has 3,000 acres of land, with five miles of frontage on the river, and he also owns 800 acres in Reno county. His testimony as a whole is interesting and valuable, and will hereafter be cited. Incidentally he says:

> "As to what I depend on on my land to make the crops, I would say *rain* and *work*, and if it don't rain we don't get any crop as a general thing." (1711.)

W. F. Stevens, of Wichita, a farmer, has lived on the river since 1870. He says:

"I raised on my land corn, wheat, oats and potatoes, and I think the crops are as good now as they ever were if the season is favorable. We raised poor crops before, in the early days, and we have raised better crops since. I attribute the loss of crops in those early days to the dry weather, and I attribute the loss of crops now to the dry weather." (1647.)

George Foster, of Hutchinson, is a farmer who has lived on the river for thirty-three years. He says:

"As to the productiveness of the lands along the valley of the Arkansas river in this county, with which I am familiar in later years compared with a like period in the earlier years, I would say, why, it has gained in crops. Our land has gained in production. I should say that the productiveness for the last fifteen years of these valley lands in Reno county as compared with the productiveness of the same lands for the first fifteen years, per acre, on the average, has increased. *We get more bushels and better crops.*" (1631.)

John F. Lewis, of Great Bend, who has been farming, and is now in the real estate business, and has lived in Barton county for thirty-two years, says:

"As to our crops that have been raised in this county for the last six or seven years compared with the crops raised in the county here in the valley of the Arkansas river in the earlier years while I was here, I will say that

> our crops are *immeasurably better since 1897* and *more uniform than ever before,* with the exception of a few years like 1884 and 1878. Those were good years. Taking it as an average for a period of seven years, the crops are far better." (1604.)

George N. Moses, of Great Bend, Kansas, has lived there most of the time since 1871. He has filled the offices of sheriff and county commissioner, and has also been mayor of the city of Great Bend. He says:

> "Land values have gone up here lately on account of the big crops of wheat. Ten years ago Barton county was not considered one of the half dozen great wheat counties of Kansas, and to-day it is. During the last eight years it has been coming right to the front, and wheat is now our principal crop." (1584.)

T. G. Payne, of Larned, has been a farmer and stock raiser in that locality since 1873. Speaking of the productiveness of the land he says:

> "Comparing its production for the last five years with any other five years during that period, I would say we have had the best production in the last five years." (1551.)

The witness further says:

> "I am somewhat familiar and have been for many years with the lands in the valley of the Arkansas river throughout this county,

and the productiveness of those valley lands in Pawnee county are now, taking a period of five years, more productive than they were in the earlier times, and the valley lands of the Arkansas river in Pawnee county are now more valuable than the same lands were in the past." (1552.)

H. Juneau, of Dodge City, testifies at length as to crops, values, conditions of the river and the so-called underflow, and was cross-examined at great length. On the point under consideration, the following passage from his cross-examination will illustrate his views:

"Farming is more profitably conducted in this county now than it was when I came here. There is a better class of farmers, and those that stayed here *are all in splendid shape. They are out of debt.*" (1543.)

3. It will be observed that up to this point in discussing the subject of Kansas *adversity,* we have entirely ignored any consideration of cause and effect. If the fact is that Kansas is now prosperous rather than desolate, if its condition is improving rather than deteriorating, then we have no occasion to seek for a cause for desolation or disaster—we need not seek the sources of ills that are purely imaginary or fictitious.

But in this connection, perhaps we should not disregard the fact that many witnesses produced by complainant, State of Kansas, do in fact say that the productivity of lands per acre in certain portions of the Arkansas valley has been less in recent years than

in earlier years. From this bare fact so put in evidence the argument is sought to be deduced that such diminution of crops is due solely to the diversion of waters of the Arkansas by irrigators in Colorado. It is to be borne in mind, however, that ever since the sons of Adam first began to till the soil, they have experienced irregularity and alternation of seasons. There would be good years and bad years, and so it has been from the beginning of time. If the rains came at favorable time, in appropriate quantity, plant growth was stimulated and product increased; if drought came and was long continued, plant life was stunted and harvest decreased. In the history of this world of ours, the alternation of fat years and of lean years has not been confined to the reign of that Pharaoh who had for his minister Joseph, son of Jacob. This experience of alternations of good years and bad, or of a series of good years and a series of bad, has marked every agricultural district in the world and especially those dependent in any measure upon rainfall.

The State of Kansas officially compiles agricultural statistics, which statistics are by the secretary of the board of agriculture of the state published biennially under authority of law. Professor Carpenter, as a witness for the State of Colorado, has compiled from these statistics certain tables, and prepared certain diagrams illustrating the fluctuations in the production per acre of corn and wheat in certain parts of Kansas. These are set forth in exhibits, being Colorado's Exhibits 28 and 29, to which we ask the attention of the court. In reduced form the diagrams connected with these exhibits are here inserted. The diagrams giving the results of these com-

EXHIBIT 29-1

This diagram is a graphical representation of the tables of winter wheat yields in the three valleys, on separate sheets, from the Reports of the Kansas State Board of Agriculture.

The Counties in each valley are grouped; the intention being to place the counties similarly situated in corresponding groups.

They are shown by the diagram.

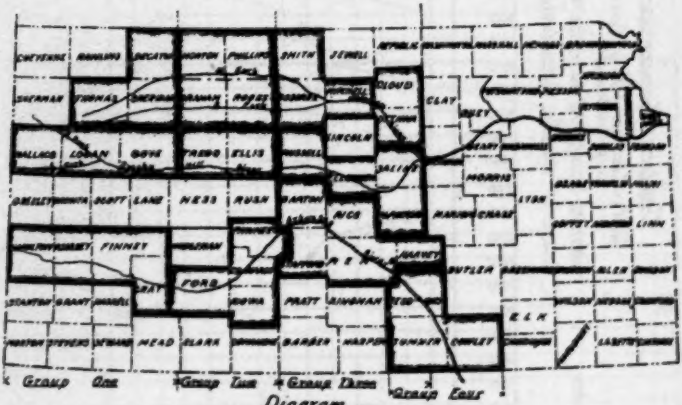


Diagram
Showing Location
of
Counties Forming the Groups

Part of EXHIBITS 28 and 29

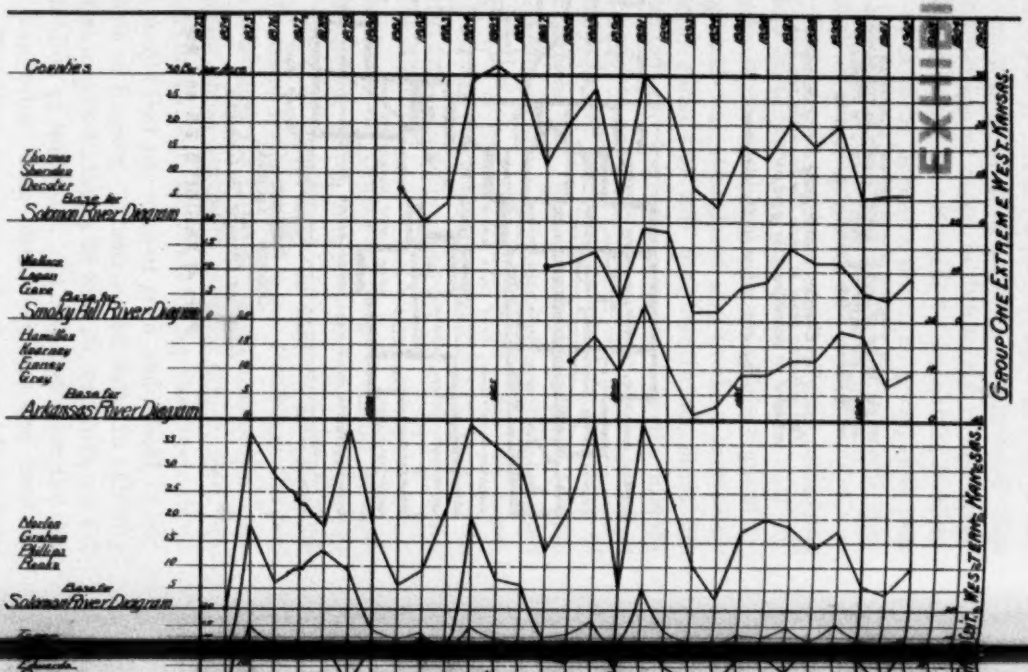
EXHIBIT 29-1

Corn

Vertical Scale – Yield in Bushels per Acre.
Horizontal Scale – Shows the Years

Graphical Comparison of Yield of Corn per Acre in Kansas in the Three Valleys of the Solomon, Smoky Hill and Arkansas Rivers by Groups of Counties Correspondingly Situated.

Exhibit-29-
Colorado.

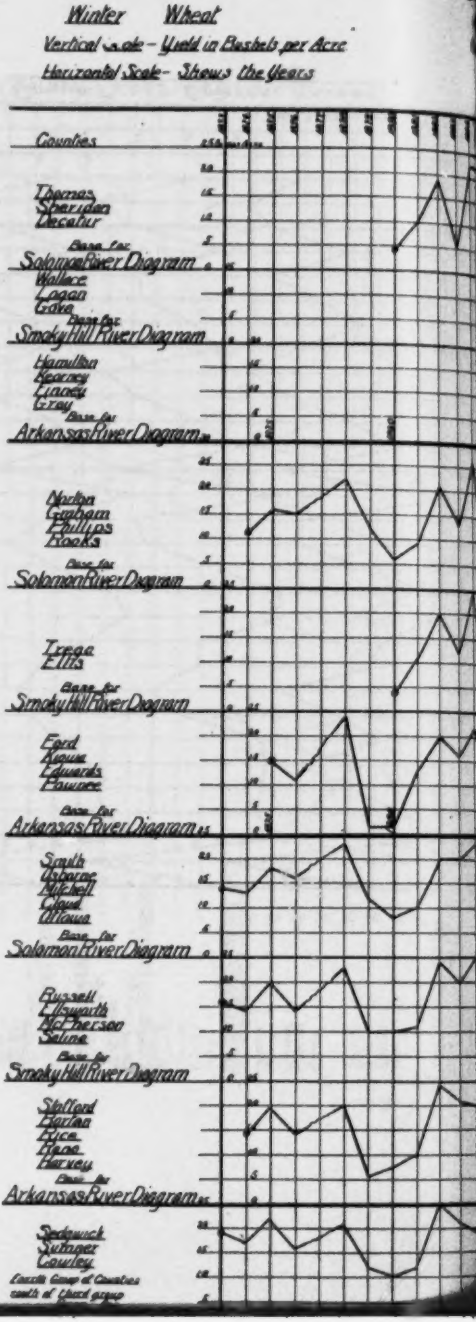


Exhibit

Group Three Central Kansas.
Arkansas Vly. Kan.
EXHIBIT 28-

EXHIBIT 28-1

EXHIBIT S


Winter Wheat
Vertical Scale - Yield in Bushels per Acre
Horizontal Scale - Shows the Years
Counties
Thomas
Sheridan
Decatur
Base for Solomon River Diagram
Wallace
Logan
Gove
Base for Smoky Hill River Diagram
Hamilton
Kearney
Finney
Gray
Base for Arkansas River Diagram
Norton
Graham
Phillips
Rooks
Base for Solomon River Diagram
Trego
Ellis
Base for Smoky Hill River Diagram
Ford
Kiowa
Edwards
Pawnee
Base for Arkansas River Diagram
Smith
Osborne
Mitchell
Cloud
Ottawa
Base for Solomon River Diagram
Russell
Ellsworth
McPherson
Saline
Base for Smoky Hill River Diagram
Stafford
Barton
Rice
Reno
Harvey
Base for Arkansas River Diagram
Sedgwick
Sumner
Cowley
Fourth Group of Counties south of third group

phical Comparison
Wheat per Acre in Kansas.
Arkansas Rivers
Exhibit-28-1, Colemanp.
Counties
Group One-Extreme Western Kansas
Group Two-Central Western Kansas
Group Three-Central Kansas

pilations first take a group of counties from the southern to the northern sides of Kansas at the west end of the state. Another group is immediately east of the first, and includes from south to north what might be called central western Kansas. A third group gives central Kansas.

For each of these groups we have three diagrams. One pertaining to that territory in the northern part of Kansas, draining into the Solomon river, which runs easterly substantially parallel with the Arkansas. There is below this a diagram for the territory draining into the Smoky Hill river, which river also runs easterly parallel with the Arkansas, and between the Arkansas and the Solomon. The third and lower diagram is for the Arkansas valley. From the official reports of the yield per acre of corn and wheat, respectively, these diagrams are made, showing by years the fluctuation in numbers of bushels per acre produced in the several sections.

For the purpose of the argument we call the especial attention of the court to Exhibit No. 29, relating to the yield of corn. The very remarkable uniformity of fluctuation in production in different parts of Kansas is shown by a glance at this diagram. Referring to specific years we call attention to the fact that the production was uniformly very low in the year 1887; that in the year 1889 it was very high, and uniformly so in the several sections of the state, and especially in those constituting the same group as shown in the diagram, and that in none of them was the crop any better than in the Arkansas valley. But, again, in 1890 there was almost an entire failure of crop, and uniformly so in the different sections of the state. But in 1891, again, an excellent crop.

In like manner we would call attention to the year 1894, marked by a very bad crop through all these sections of the state. In 1899 uniformly there was an excellent crop, but in 1901, again, there was almost an entire failure, while in 1902, the last year reported in these statistics, there was, again, an excellent crop in central Kansas and in the lower Arkansas valley; and the production in the Arkansas valley, both south of Wichita, and immediately west of that point, was considerably better than in either the Smoky Hill country, or the Solomon river country in the same group.

These statistics, so illustrated by diagram, clearly demonstrate the fact that the causes for fluctuation of seasons and alternations of good years and bad in the Arkansas valley were causes which were operating simultaneously in territory outside of that valley, unaffected by any problem of irrigation or diversion of waters, and the conclusion becomes inevitable that the causes for such fluctuations were general and not particular, and were of a character constantly prevailing everywhere, and creating diversity of years, good and bad. The actual and specific cause is not difficult to find. The United States, as intervenor, has put in evidence, as its Exhibits 17 and 18, records of rainfall in the State of Kansas. Professor Carpenter, as a witness, calls attention (1823-24) to the fact that the years of a good corn crop are coincident with the years of sufficient rain in the growing months, June, July and August, and that the years of a bad corn crop in these several sections of country alike are coincident with the diminished amount of rainfall in the same territory. The whole matter of fluctuations of crops dwelt upon by the

witnesses for the State of Kansas is fully explained by well known causes, which have affected agricultural success from the beginning of time, and in all parts of the arable world.

The complainant's counsel in their brief fix the year 1890 as the beginning of the time of bad effects in Kansas from the diversion of waters in Colorado. (Plaintiff's brief, pages 47, 51, 98, etc.) We call attention, however, to a table of production of crops per acre in the State of Kansas, submitted by the complainant in rebuttal, through F. D. Coburn, of Topeka, secretary of the state board of agriculture (2268). This table is a very significant one in various particulars, and among others, in its confirmation of some of the testimony of witnesses already quoted. We have called attention to the statement of R. E. Edwards, of Kinsley, a witness for the plaintiff, to the effect that in 1903 they had as high production in wheat in the Arkansas valley as ever known, and he gives an instance of one farm which yielded fifty-two bushels to the acre. This table (2268) shows that in 1903 there was in the state at large a good production of wheat. The table shows, however, that in 1902 there was a practical failure in the wheat product in the entire State of Kansas. We have quoted from J. H. Smith, a witness for the State of Kansas, to the effect that in 1901, in the vicinity of Sterling, they had had their "bumper crop" of wheat, and the table (2268) shows that the yield of that year on an average in the state had been exceeded only three times since 1884.

As to the corn crop we have quoted T. B. Unruh as saying: "Well, in 1890 we didn't have any corn. We got mad and quit raising corn." (2054.) The

table referred to (2268) shows that there was less than nine bushels to the acre in the state at large that year, although in the immediately preceding year there were forty bushels to the acre, and in the two following years twenty-two bushels to the acre over the state at large. There was a failure of the corn crop in 1901, but in the three following years the yield in corn was as good as in any three consecutive years subsequent to 1885, and numerous witnesses produced by the defendant show that these same years were good in the valley of the Arkansas.

Referring again to the wheat crop and the table shown on page 2268 of the record, it will be observed that for three consecutive years, 1885, 1886 and 1887, all prior to the beginning of the complaint as to diversion of water by Colorado, the crop was almost a total failure. That for the next five years, including 1892, the crop was good, and especially so in the year 1892; that in the next four years the crop was very bad. That in the next two years, 1897 and 1898, it was good. That in 1899 it was bad. That in the next two years, 1900 and 1901, as already mentioned, it was excellent. In 1902 it was bad, and in 1903 and 1904 fairly good.

We have here emphatic illustration, in the statistics produced by the complainant, of the ordinary fluctuations of crops according to seasons, independent of any special or unusual circumstances, such as are attributed to the situation in the Arkansas valley, and this evidence gives strong confirmation of the proposition we have been discussing, as to the uniformity of causes operating in common in the Arkansas valley and the other parts of the State of Kansas during these years.

Counsel for the State of Kansas, in examining Mr. Coburn at Topeka, felt it necessary to inquire as to the reasons for a diminished yield of wheat and oats in recent years as compared with earlier years, as shown by statistics compiled for the state at large. The witness gives the following explanation:

> "As to how I explain that decrease in the average yield per acre, as shown on these three pages, I will answer, I know of but one explanation, and that would be that in the earlier settlement of the state, when the immigrants took the choice of all this land, they naturally took the land adjacent to the streams, presumably the most fertile and productive, and the earlier statistics are made up from the yields of these more productive lands, and as the state has advanced in years these outlying lands on the hills and slopes have been occupied, presumably the thinner or less desirable lands, and the more of those less productive lands that have been put into cultivation the smaller the general average of a given county would be likely to be. As to whether these statistics of the average yield show that the average yield has decreased and show that there has been a decrease in productiveness of the bottom lands along any particular river, I will say, not in any wise, no, sir." (2267.)

It is very certain that this explanation applies with all its force to the lands in the counties along the Arkansas river, and if statistics show that lands were more productive in the '70s or early '80s, than

they have been in later years, we find here an abundant explanation of that fact, and it is an explanation which is common to the whole State of Kansas, and especially to the Arkansas river country.

We respectfully submit that in so far as the griefs of Kansas grow out of any alleged depreciation in the value of lands in the Arkansas valley, or the reduction in crops or diminution of prosperity among its people, those griefs must be found to be purely imaginary. And, regardless of any action taken by the State of Colorado, or its people, and whether or not the whole Arkansas river in Colorado has been diverted, or even absolutely suppressed and destroyed, the complainant has not on these general features of this case established any occasion for or right to relief, and we may fairly claim that unless some other ground of complaint alleged in the bill is sustained by the evidence, this cause should, without the burden of investigating the law as to the rights of parties, be forthwith dismissed.

4. *The State of Kansas as a private proprietor.*

The bill of complaint, however, does set forth certain specific matters of alleged grievance. As to the subjects we have heretofore discussed, it may be said that the State of Kansas sues as *parens patriae,* to use an expression of plaintiff's brief, but, aside from this "father of his country" attitude of the complainant, the bill alleges that the State of Kansas is a private proprietor of certain lands, to wit: a certain tract of land containing one hundred and twenty-six and a fraction acres in Ford county, the same being not far from Dodge City, and used for a Soldiers' Home; and a certain other tract, consisting of about six hun-

dred and forty acres, and situated in the county of Reno, near Hutchinson.

The State of Kansas, suing as a private proprietor, says in its amended bill (74) that the land used for a Soldiers' Home has been greatly damaged and especially injured by reason of the diversion from its channel of the water which would otherwise flow in the said river by and underneath the said tract of land.

> "Its fertility has been greatly diminished, its water supply lessened, and its salubrity and utility impaired, and, unless the natural and normal flow of water is restored, the value of said property will be entirely destroyed, and the same will be rendered unfit for use as a Soldiers' Home, or for any purpose whatever."

Now here is a claim of special and specific injury. It is very slightly touched upon in the brief of counsel for the State of Kansas, and it entirely disappears from consideration in the summary set forth in nine paragraphs at the conclusion of the plaintiff's discussion of facts. There is good reason for this omission, when we consider the evidence upon the subject of this alleged invasion of the proprietary rights of the State of Kansas. The complainant, in making its case in chief, introduced a witness by the name of Robert N. Wright, of Dodge City. So far as we have been able to find in this voluminous record, he is the only witness whom, in the making of its original case, the complainant examined as to this Soldiers' Home, and then did so as a sort of an after thought on re-direct

examination, after the close of the cross-examination. And the testimony elicited was as follows:

> "The Soldiers' Home is located five miles east of here, directly on the banks of the Arkansas river. There are two hundred and sixty acres of land contained in the Soldiers' Home, and the northwest quarter of section 3, 27-24, and some adjoining lots. It has been in the possession of the State of Kansas since 1889. Formerly it was occupied as a United States military post, as the United States military post of Fort Dodge. Those premises are well improved. There is a large garden there and the balance of the ground is in alfalfa and natural grass. About fifty acres of it is farmed and cropped. Nearly all of these premises are in the first and second bottoms." (454.)

Now here is a very good description of the property, and its character, showing that it is well improved, with a large garden; that it has alfalfa and natural grass and a considerable portion of it is farmed and cropped, but not a word is said about its having suffered any injury. Upon that subject the witness is silent, and we have been unable to find any evidence which, in its original case, the complainant submitted to show that there had been any injury to these premises of the Soldiers' Home. The subject is left to the deduction to be made from the evidence as to general depreciation of property in the valley of the Arkansas, and to that alone.

When the defendant was producing its evidence at Dodge City, its counsel went to the commandant

of this Soldiers' Home to seek information and to ascertain who could give testimony as to the real facts relating to this tract of land. The commandant, Mr. S. H. Thomas, referred them to an inmate of the Home, by the name of W. J. Spencer, and Mr. Thomas himself makes this statement:

> "My reason for doing so was that he lived here in fort days. I did that. I was going to say why I did that, but probably you wouldn't want it. I did that from the simple fact that he had been there and knew all about the river, and knew about these wells, and knew about our ice pond, and knew about the ice-house and things that were there then, but they are now of the past; they are not there." (1945.)

Mr. Thomas declines to admit that he himself gave as a reason for not wishing to testify himself in behalf of the State of Colorado, that it would be embarrassing to him to do so, by reason of his position, and thinks he could not have made that statement:

> "Because, if I know my make-up, I have never been delicate, because nothing of the kind would prevent me from doing a duty. As to whether I suggested one of the inmates of the Soldiers' Home there as one of the witnesses *and asked not to be called as a witness,* I will say I did." (1945.)

Well, as a result of the conversation with the commandant at the fort, a person designated by him, to wit, Mr. William J. Spencer, was called as a wit-

ness by the State of Colorado, and this witness, besides testifying in reference to the conditions of the flow of the river in earlier and later years, makes the following statement concerning the Soldiers' Home:

> "I am acquainted with the hay lands at the Fort Dodge Soldiers' Home, and there is still some of that land in hay, yes, sir, I think about sixty acres, probably. They are putting a good bit of that land now into alfalfa. Yes, sir, there is something in the neighborhood of sixty acres left now. I could hardly get at the amount of hay per acre as compared with the earlier years. We are putting up more hay now because we have more cattle and horses to feed. Before, of course, we didn't cut all the hay. We didn't cut it down for hay. We just cut what we needed and let the balance go. No, I don't know as I ever noticed any difference in the amount of hay that did grow there. It is just about the same, I think, from one year to another. As to my having ever heard any complaint at the Soldiers' Home to the effect that the crop of hay on that land had ever been affected by the rise or fall of the water level, I would say that I have by a *rise*, yes, sir, but not by a fall. No, sir, I never heard of any injurious effect from the fall of the water level. The water rose and took away our hay stack once. Yes, sir, it got over the land. I never heard it talked that there was any injurious effect to this hay land on account of the fall of the water level, and as to whether or not in the *thirty-*

seven years I have lived here I have ever heard of any lands or crops being injured on the bottom lands or second bottom lands by the fall of the water level, I would say, no, sir. What little crops we are using at the Soldiers' Home down there I guess have been just about the same as always. If anything, a little better. The land down there to-day is worth more than it was formerly—more than I ever knew of its being worth. Yes, sir, the Soldiers' Home where I am quartermaster now is the Soldiers' Home that belongs to the state and is located five or six miles east of Dodge City and borders on the Arkansas river. That is the same land that was laid out and called Fort Dodge in the 60's." (1527.)

Another witness upon the subject was produced by the defendant State of Colorado, by the name of John D. Sidlow, who says:

"Yes, sir, I was connected with the Fort Dodge Soldiers' Home for awhile as quartermaster. I think I went there in that capacity in 1893, and was there a little over five years. Yes, sir, they have some grass lands on the border of the river there belonging to the Soldiers' Home, and I was well acquainted with the production of those grass lands. Yes, sir, I saw those lands before I went there as quartermaster; and I should think that the grass lands that we used at the fort there some years were used as grazing lands, so that I could hardly com-

pare it. There was a good growth of hay there. There was always a good cutting of hay on those lands, and that was true *all the time I was there.* No, sir, I never heard of those grass lands being rendered less productive because the water level had fallen. Nothing of the kind, no, sir. I don't know what the production of those grass lands has been during the last three or four years, of my own personal knowledge, only have noticed in passing by that they put up about the usual amount of hay there, but I have no knowledge of just what is—I should judge that there was in the neighborhood of fifty or sixty acres of grass lands that were mowed over there when I got there. They raise alfalfa there also, yes, sir. The alfalfa land is on a bench that runs up to the river. It is not really the first bottom; it is right next to the river, but it is higher land than the wild hay land is. And they had good alfalfa there during the time when I was there, *all the time,* yes, sir. I think the alfalfa was sowed the year before I went there, and I think it has continued good *up to this time."* (1512.)

Now, in the light of this testimony, the plaintiff felt compelled, apparently, to go into this subject on rebuttal, although it was plainly a matter, not for rebuttal, but for original evidence. But on rebuttal they produced Mr. S. H. Thomas, the commandant of the fort, whose knowledge of the premises does not go back of 1895, and in a very brief and indefinite way he suggests some diminution of the hay crop. He

thinks that the flow of the river has been less than formerly, and that this circumstance affects the bottom lands "to a certain extent," and adds:

> "As to what effect it has, I will answer, now, not this last spring, but in other years, we have a little more than six acres of meadow land right adjoining the river on the north side. The *hay crop* is not as good as it used to be, because it doesn't have the moisture, because the water is not in the river as plentifully as it used to be." (1940-41.)

This feeble testimony, as to a slight diminution of the hay crop on six acres of meadow land (and an infinitesimal diminution would satisfy the statement) is the only injury which the witness shows to the lands of the Soldiers' Home, unless we also include the fact that they had deepened their wells "to catch up with the flow of the river." As feeble as this testimony is as a support to the plaintiff's case, it descends to the region of *de minimis* on cross-examination. He says:

> "As to how the lands have produced, say for the last five years as compared with their production under my predecessors, I will say, in speaking of wild hay land, we had a better crop of wild hay along in the years 1895, 1896, and the spring of 1897—we had better crops than we have now since the years 1901, 1902 and 1903, and I would state this, that there are years—now, this spring we may have a better crop than we maybe had three or four years ago, because

we have a greater abundance of rainfall. We have had seasons when we had light rainfall, and we had a much less production than when we had a good rainfall; and it is considerably deeper to the underflow water than it was in 1895. As to how the productiveness of the lands at the Soldiers' Home have compared since I have been commandant there, according to the reports, with what they were for the five years before I took charge, I will say, *we have a fair turnout or productiveness,* I might say, of garden vegetables now because we have resorted to irrigation. We have had good vegetables without that, but of late years we have had to go to the irrigating scheme, and on the hay land more particularly we don't have as good a hay crop as we used to. Now, I don't want to be stating that this takes place every year. I have seen years when there was but little rainfall, back in 1895, when they would have a fine turnout of hay. I have seen seasons where this same hay land wouldn't give as good a turnout of hay." (1942.)

And this is all of the testimony upon this subject.

As the special injury to the premises of the Soldiers' Home is given prominence in the bill of complaint, as a specific reason for relief, as set forth in paragraph five of the bill (68), and in the allegations as to injury already quoted (74), we have deemed it appropriate to give the subject thorough consideration, and with all deference to the counsel who drafted

the bill and produced the evidence for Kansas, we must respectfully submit that this evidence shows absolutely no injury suffered by the State of Kansas as to this property known as the Soldiers' Home. Even the very slight testimony, coming from the commandant, S. H. Thomas, is completely overthrown by two witnesses produced by the defendant, who speak with greater knowledge of the subject.

The only other specific matter mentioned in the bill of complaint relates to the reformatory lands in Reno county. They are described at length in paragraph six of the amended bill (68, 69) and on page 74 of the record, after the description of the injuries inflicted upon the Soldiers' Home, the amended bill says:

> "And the same is true of the property of your orator situate near the city of Hutchinson, and used for the purpose of a state industrial reformatory."

This is the last we have heard of the lands of the reformatory. Not an allusion to it in the plaintiff's evidence, in the original or rebuttal testimony; not an allusion to it in the complainant's brief. The subject is absolutely dropped.

We have now presented the features of this case relating to injury resulting from alleged diminished flow of the Arkansas river through the State of Kansas, or injury resulting from alleged diminution of what the complainant calls the underflow, and upon the testimony elicited upon these subjects we must again insist that, on the matters of injury from lack of water, alleged in its bill of complaint, the complainant has absolutely failed to make a case.

There are other matters of asserted specific injury disclosed in the evidence, and in the brief of counsel for the State of Kansas. As, for example, the loss of water power at Arkansas City. Such matters as these, not covered by allegations in the bill, will receive consideration at a later stage of this argument.

II.

THE ARKANSAS RIVER, *UT CURRERE SOLEBAT*, HAS ALWAYS BEEN AN INTERMITTENT STREAM, AND, IN TIMES OF LOW WATER, HAS BEEN A "BROKEN RIVER."

From the earliest times the Arkansas river through Western Kansas has been merely a bed of sand, with practically no flowing water during a large part of the year, and this strip of bare sand bed separates the perennial Arkansas of Southern Kansas from the perennial Arkansas of Colorado during all times of low water, making a "broken river." This fact is so thoroughly established by written history and oral testimony as to preclude any possible refutation.

1. Historical references and oral testimony covering specific years.

1806. October. Major Zebulon M. Pike describes the Arkansas as follows:

> "It has one singularity which struck me very forcibly at first view, but which, on reflection, I am induced to believe is the same case with all the rivers which run through a low, dry, sandy soil in warm climates, as I ob-

served it to be the case with the Rio del Norte, viz: For the extent of four hundred or five hundred miles before you arrive near the mountains, the bed of the river is extensive and a perfect sand-bar, which at certain seasons is dry, or at least the water is standing in ponds, not affording sufficient to procure a running course; but when you come nearer the mountains you find the river contracted, a gravelly bottom, and a deep, navigable stream. From these circumstances it is evident that the sandy soil imbibes all the (not evaporated) waters which the sources project from the mountains, and renders the river in dry seasons less navigable 500 than 200 miles from its source." (635.)

1833. Timothy Flint, in his "History and Geography of the Mississippi Valley," says:

"The principal river of this territory (Arkansas), whence it derives its name, and the next largest tributary of the Mississippi after the Missouri, is the Arkansas. The extent of this mighty stream is about 2,000 miles. In summer it pours a broad and deep stream from the mountains upon the arid, bare and sandy plains. The sand and the dry surrounding atmosphere so drink up the water, that in the dry season it may be crossed many hundred miles below the mountains, without wading as high as the knees." (635.)

1839. Oliver P. Wiggins, of Denver, witness:

"In 1839 I saw the river about the middle of June. It was at a point near the mouth of Walnut creek, which heads in Kansas. * * * At that time I was about a month along the river. We started to go down to Great Bend to guard a train there and we went over to the river and followed it down, on account of the water being scarce all through that country there, and when we got over near the mouth of Walnut creek the water sank and then we had a heap of trouble in getting down from there. We would have to dig holes in some places to find water, and at other times we could get it without digging." (738.)

Speaking again, this witness says:

"In 1839 we started to go down the river again, and the river had gone dry. This was a little over 200 miles out from where Canon City is now. There were holes of water along the river but it didn't run. That was at the mouth of Walnut creek, at the sand ridge, as we called it. The river never went dry at Rocky Ford; it always ran there. When I first saw it dry was one good day's travel below Pueblo; to Rocky Ford and from that on down there was just the water holes until you got down to this big sand ridge and there it went entirely dry. That was the condition of the river in 1839 from below Rocky Ford a short distance to Wal-

nut creek, in the State of Kansas, during the months of June and July." (739.)

1840. The witness Wiggins says:

> "In 1840 the river went dry pretty nearly in the same way, not quite so dry as it did the year before, but there were water holes all along that year, as near as I can recall. We didn't have much digging to do to get water for our stock. There was no water running in the river from about the last week in June until August. We left the river in August. During the time I have mentioned we were scouting and riding up and down the river." (739.)

1846. Francis Parkman, in his work called "The Oregon Trail," speaking of a point about three days' travel below Bent's fort, which would bring it close to Lamar, Colorado, says:

> "The Arkansas at this point, and for several hundred miles below, is in August nothing but a broad bed over which glide a few scanty threads of water, now and then extending into wide shallows. At several places, during the autumn, the water sinks into the sand and disappears altogether." (635.)

Louis H. Garrard, in his book, "Wah-to-yah and the Taos Trail," speaking of October, 1846, says:

> "We awoke on the morning of the 16th with a norther penetrating our blankets. The river Arkansas, almost dry, and on whose

north bank we were encamped, was covered with floating particles of thin ice. On the 23rd we came to the Cimarron crossing of the Arkansas river. The river at the crossing was wide and but a few inches in depth, and a good ford. On October 31st we crossed Big Sand creek, a large bed of sand one hundred yards in width, covered with water during very rainy seasons, but then dry. The Indians camped upon it a half day's journey from its mouth, where there is much water. Below that point the sand absorbs it." (636.)

The witness Wiggins says:

"1846 was a bad year. The river went entirely dry by the middle of June and the buffalo all left there. There were no water holes on the Arkansas in 1846, * * * The water was sunk all the way from Rocky Ford that year. * * * We couldn't get water by digging for it that year—in 1846." (740.)

1851. First Lieutenant Beckwith, Third Artillery, United States army, makes a report to the secretary of war, and speaking of his experiences on July 16th, 1853, he says:

"The river is unusually high, being from one hundred and fifty to two hundred yards wide; and the Indians, in crossing it, are occasionally seen swimming; while two years ago at this season, I am told by the officers of the army who were then there, that it was

necessary to dig in the bed of the river for water to drink." (637.)

1854. Edward Everett Hale, in a book entitled "Kansas and Nebraska," makes this statement:

> "At Bent's fort there is but little timber. Timber sometimes appears in small sections; but in general for several hundred miles the river is most of the year a broad sand-bed, over which a few threads of water glide along, occasionally expanding into wide shallows. In the autumn the water sometimes sinks into the sands and disappears altogether." (637.)

The witness Wiggins says:

> "In 1854 I was along the river for considerable distances, going down the river only. * * * We went down the river that year about the 10th or 12th of June. It was terribly dry. There were water holes. We had to dig for water that year. That was the condition all the way down until we got to the mouth of the Pawnee. Then there was water from there down—good rains and plenty of water. * * * We suffered a good deal. In some places you might dig six or eight feet in the sand and not find any water. That was the case in 1846 and 1854. They were two terribly dry seasons." (741.)

1858. September. Anthony Bott, witness, says:

> "There was no flowing water in the Arkansas where we struck the river near

Great Bend, about either the first day or the second day in September, 1858. There were pools of water that you could go around and cross the river dry shod." (818.)

1859. Henry Hegwer, witness, says:

"In the fall of 1859 we traveled the river from Great Bend to Larned, making four or five trips. The distance is about thirty-five or forty miles. The river was dry all that time, and we got our water out of the Walnut and then out of a big pool on Ash creek. We got our next water out of the Pawnee. I was there in November and December, 1859, and in January and February, 1860. The buffalo were pretty scarce at that time. It was on account of the drought that they were scarce." (749.)

Robert N. Wright, a witness for the State of Kansas, says:

"In 1859, along in the fall, the river got pretty low in September. In those early years the river went dry once every three or four years, along in September. I don't think it went entirely dry in 1859, but I don't know. For a short time in the fall it was pretty nearly dry, so that it only ran from one puddle or hole to another in small channels, and once in every three or four years it went almost entirely dry in the early years." (446.)

Daniel L. Taylor, a witness, says:

> "In traveling along the river I remember one particular circumstance, and that is about all I can remember about it. Coming up the river at what I think was Bent's new fort, about where Fort Lyon is now, it might have been a little before we got there, some one remarked, 'Across the river, that is New Mexico.' And I said, 'What river? I don't see any river.' Well, they said the river was dry now, but right across there it was New Mexico." (1004.)

1860. A. Z. Sheldon, a witness (this is the same A. Z. Sheldon who made survey of Baca Grant No. 4 in 1863, see 170 U. S. Rep., 320, 322, 324), speaking of a point some distance west of the Big Bend, says:

> "The condition of the Arkansas river as to water at that time was quite disappointing to me. I expected to find a live, flowing stream, instead of which I found a bed of sand with places where the water seemed to be flowing a little, but I could walk across the river without getting into water at that time." (831.)

Lewis Conley, a witness, says:

> "I saw the Arkansas river first in 1860 at, I think, Great Bend, about sometime in May. * * * I recall very distinctly the first time I saw the Arkansas river and the

impression it created on my mind. I was surprised to only find a great, sandy channel or bed and to hear it called a river, with no water in it. It rather struck me as though we hadn't struck the Arkansas river yet, but still we were told that was the Arkansas, and it was. We followed the course of the river from there clear up to Canon City. The river was perfectly dry at the point where we first struck it, and I think the first place we struck running water was about where Fort Lyon, Colorado, is now. The water was simply running at that point in a small stream. I am not sure that we struck much water, though, until we got above Fort Lyon. I think we struck a channel of water there and it sank into the sand." (859.)

Charles Schaefer, of Wichita, Kansas, a witness, says:

"I crossed the river twice in 1860; that is my recollection; and I crossed it both times, I think, at the Cimarron crossing; that is near Fort Dodge; and the river in that year was dry. Wherever we camped I noticed sometimes we had to get out with shovels and dig for water, yes, sir, for stock, but then we found puddles now and then. Yes, we found holes now and then where there was water, just as you do now." (1683.)

This witness, on cross-examination, says:

> "It may be that when I found the river dry at Cimarron crossing it was in September, 1860; 1860 was the driest year I ever saw in Kansas, I believe. Yes, I think it is correct that it is so known in the history of that state and territory, that 1860 was the driest time ever known, and I believe that drouth lasted longer than any other drouth in its history." (1685-6.)

M. M. Murdock, the first and leading witness for the State of Kansas in this case speaks of having reached the Arkansas river about the 15th of June, 1860. He says:

> "When we got up the river a little way, somewhere probably toward Bent's old fort, the water was so low in the river that we dug holes to get water to drink. That is, in the margin of the river we dug holes. In the vicinity of where Dodge City is now located, in the evening after a hot day there would be hardly any flow at all, and my impression is that from Dodge City up to Bent's old fort we didn't strike water of any amount. It seemed to come up in the night, and as we approached the mountains we found plenty of water. I think that in the region where Coolidge and Garden City are now located the river was especially dry, and we began to find some water again at Bent's fort. Bent's old fort was located near the present

town of Lamar. As we proceeded towards the mountains from Bent's old fort, we found the flow of water in the river increasing, and at Pueblo there was considerably more water in the river than at Bent's fort. The river was more particularly dry at that time from Fort Dodge to Fort Bent during the evening or afternoon of the day." (255.)

A. B. Caldwell, a witness for the State of Kansas, says:

"There was one very dry year between Wichita and the Colorado state line between 1850 and 1860 or 1861. I don't know where or when, and I can't place it. My memory is that there was one year that was extremely dry and the water was extremely low. * * * During that year there were miles along the river at different places where there was practically no flowing water in the river—very little at least. * * * That year people traveling up and down the river sank holes in the sand of the river to get water at different places." (360.)

William Mathewson, of Wichita, a witness for Kansas, on rebuttal, says:

"As to there being a stretch of the Arkansas river from Great Bend or at least from Dodge City up to the Colorado line that has always been very subject to going dry, I

will say, well, in some cases. I have seen some seasons it was pretty nearly dry. It would stand in pools. September is the worst month we have here for dry weather. Yes, sir, the river was dry about Dodge and west of there for a distance toward the Colorado state line in 1860, and in 1863 I don't know how far it extended west. I know from here up to about Dodge City it was very nearly dry." (2154.)

1861. Deane Monahan, a witness, says:

"When I passed up the river in the month of August, there was no running water at that time at all. The stream was dry, with occasional water holes in the bed of the stream, but no running water whatever. I crossed the river every day during the time I traveled along it." This was between Great Bend and Cimarron Crossing. (784.)

Henry T. Galbreath, a witness, says:

"As we went down the Arkansas river that year there was very little water about Great Bend. After we passed Larned—that is where Pawnee fork comes in—there was reasonally enough water for cattle. We could water the cattle without any trouble after we passed Larned." (795.)

Speaking of coming up the river, the witness says:

"We commenced to notice the scarcity of the water above Cimarron, and then for

two or three or four or five days we had very little water. Cimarron is about thirty miles above Dodge, as I remember it. For five or six days we had but little water, and then we began to get what we called the mountain water and had plenty of water then." (795.) See also (798.)

V. D. Spencer, a witness, says:

"The Arkansas in two of the years, and it might be three, between 1859 and 1864, got quite dry after you got below what was called the Big Timbers, below Fort Lyon, in two of those years anyhow. In 1861 and 1862 the river went dry. * * * It was dry from about the 1st of August until the last of September, about the time I was passing over the road. * * * That was during the years 1860, 1861, 1862 and 1863, up to 1864. * * * No, in 1864 there was plenty of water in every part of the river that I saw. There was more rain. * * * The dry part of this period was in 1861, 1862 and 1863. That is my recollection. There was no water in the river after you got below what we called Big Timbers then." (814, 815.)

John Ross, a witness, speaking of the spring of 1861, says:

"We struck the river in Kansas not far from Great Bend. That was on the old Santa Fe trail. We followed it up from there to

Canon City. We were on the river every day. When we reached the river at Great Bend in 1861 it was dry; that is, there was just a little seeped water would rise here and there in it. There was no regular current—no regular stream. We found it above the surface here and there, though. This was in the month of June. The best of my recollection is that it was about one hundred miles from there to where a continuous current was found flowing in the river. We were some six or seven days traveling up before we met with what you might call a flowing current." (848.)

1862. Henry C. Beckham, a witness, says:

"I left Westport, Missouri, on the 20th of August. The river at the point we struck it was practically dry. We could cross it on foot without getting wet. There was no running stream then, and I remember we didn't have any trouble after leaving Great Bend about getting sufficient water for our stock. It was a small outfit. At Great Bend there was serious trouble. We had to scoop out the sands with shovels to get water for camp, sometimes, and I think our cattle went short of water there. We scooped out the sand to get water for ourselves. As we advanced toward this country [Colorado] the water increased, and by the time we reached Pueblo there was plenty of water. As I recollect it, there was a regularly flowing stream from

the state line all the way to Canon City." (845-6.)

William A. Watson, a witness, says that he was on the river in the month of October from the old Aubrey crossing down to where the Santa Fe trail left it. He further says:

> "I think this point is some where below Great Bend. During the month of October as we went up the river it was comparatively dry in that section of the country. We found places where there was no surface stream flowing. In July, however, there was a pretty fair flow." (878.)

George W. Thompson, a witness, speaking of going down the river, says:

> "Where we struck the river, about Pueblo, as we went down the river the water got scarcer, and when we got below the state line it commenced getting pretty low between that and Dodge, and when we got down to Dodge there was not very much water in the river. We found it dry at one time when we went there, in 1862, along down there. It was perfectly dry in places. We walked across it. There were holes, though, standing, that we could water our stock from, and we dug some holes to get water out of the sand to use. It was a little better than the water that stood in the holes, after it had settled. There was more water right along by the state line. The holes were bigger and it was running

more at Dodge. As we got down say fifteen or twenty miles below the state line there was less water than at the line; but after we got say fifteen or twenty miles it was practically dry clear on down." (986.)

1863. Edward L. Berthoud, a pioneer, after whom, many years ago, Berthoud pass, in the Rocky mountains, was named, testified as follows:

"Starting from the end of June and into July there was scarcely any water in the Arkansas river at all, and at the end of July and August we crossed the river dry shod. There was no water in it at all. We crossed it near Walnut creek, at the mouth of Pawnee fork, and up above about ten miles above Dodge. Near Fort Dodge, or where Fort Dodge is now, we crossed the river and there was no water." (780.)
See also (781, 782).

William R. Beatty, a witness, says:

"In 1863 when we left Fort Lyon to go to Cimarron crossing there was a good, fair stream at Fort Lyon. As we went down the river it got less. When we got about fifty or sixty miles, to the limit of the timber, from there down there was no running water in the river at all. All the time I was at Cimarron crossing there was no running water in the river at all. It was perfectly dry as a general thing. It was perfectly dry at a point sixty miles below Fort Lyon, and that

was the condition that entire season of 1863 while I was there. The river was perfectly dry from the time I got to Cimarron crossing the first time until I left it the last time—no running water at all. My recollection is that we got down there some time the latter part of June, and I think that was near the latter part of September or a little later when we left." (787.)

William A. Watson, coming up the river from the vicinity of Great Bend to Pueblo, arrived at the latter place on the 6th of June. He says:

"The flow in the river for some one or two hundred miles west of the point where we struck it was very low. We found stretches of the river where there wasn't any running water on the surface. We would strike pools along there that there would be water in and other places there wasn't any, but we struck a constantly flowing stream at old Fort Lyon, and from Fort Lyon to Pueblo, so far as I saw the river, there was a constantly flowing stream." (877.)

Frank Gibson, then in the army, as a member of the First Nebraska Regiment, says:

"I saw the Arkansas river first close to old Fort Zarah here, about three or four miles east of town (Great Bend), and we struck it along about the last of August, as near as I remember, and there was not any flow of water in the river at that time." (1589.)

S. M. Tucker, of Wichita, saw the river in September, 1863, when he followed up the river from Pawnee Rock to Bent's fort.

> "There was some water running in the river at that time until about eight miles below Fort Larned. There was a little creek I think they called then Coon creek. Above that there was no water running until we got to within about ten miles, I think, from Fort Lyon, Colorado. From where we first found it dry to this point there was no running water on the surface. There were under the banks little holes with water in them." (1674.)

Robert N. Wright, of Dodge City, a witness for the State of Kansas, says:

> "Either in 1863, or in 1864, in the fall, I remember particularly that the river was dry. It was a very dry year." (448.)

J. R. Mead, a witness produced by the State of Kansas in rebuttal, speaking of the vicinity of Wichita, says:

> "In the summer of 1863 the river continued to flow quite a continuous stream until some time late in the fall or beginning of the winter, when it went dry, entirely dry, excepting in deep holes which were full of fish, and we caught a great many of them by making a net and sacking them." (2129.)

Again, this witness says:

> "There were two occasions, one in the late fall of 1863 and one in the year after that, which one I can't remember now, on which in the early winter the Big Arkansas river was entirely dry above the mouth of the Little Arkansas river, excepting in some deep holes." (2130.)

1864. Elliot Coues, who edited "The Expedition of Zebulon M. Pike," gives a note as to his own observations of the Arkansas river in June, 1864, and says:

> "Our route since leaving Larned has been mostly along the north bank of the Arkansas. Queer river that—a great ditch, chock full of grassy islets stretching through the treeless prairie like a spotted snake, some seasons so dry you can not wet your foot in it for miles, and have to dig for a drink, sometimes a raging flood two hundred yards wide." (634.)

James A. McCanless, a witness, says:

> "I struck the Arkansas river at Great Bend and traveled along it to this place. (Canon City, Colorado.) I struck it at Great Bend between the first and tenth of May, 1864. At Great Bend there was no water flowing at all. After we got up above to Pawnee rock there was a little stream running there, not very much. Then when we

got up to the mouth of the Pawnee fork there was quite a little water running down. There was more water coming down the Pawnee fork than there was in the river, caused by rains, I suppose. As we came up to the Colorado state line and on west into Colorado the river increased some all the way up." (847.)

John J. Thomas, a witness, says:

"We arrived at Fort Larned early in July, and stayed there until the tenth of December, perhaps, and we crossed the river frequently—perhaps twenty or thirty times during that summer. That is near the mouth of Pawnee creek. There were places there where water was running a little, three or four or five inches deep, and at other places it was dry. It would run for a little piece and then would sink and there would be a dry sand bar. It wouldn't be dry, but there was no water in sight. There were places where no water was running on the surface of the sand at all." (854.)

Oliver H. P. Baxter, a witness, was on the river in the latter part of November, or the first of December, and struck the river some sixty or seventy miles down beyond (easterly of) the Kansas line. He says:

"We only stayed on the river, I guess, about six or eight miles. We left it then. That was this side of Dodge some distance. When we struck the river and all the time

we were on it there was no flow of water at all. The reason this is impressed on my mind is that when we went into camp we had to dig in the bed of the river to get water in the sand. There was no running water at all. Dodge City was Fort Dodge at that time. There was no running water in the channel when we dug in the bed of the river." (857.)

J. W. Beatty, a witness, says:

"In 1864 I went down as far as Council Grove. I think it was in May, and we came back about the first of July. There was water in holes in places and in other places we had to dig in the sand to get water for our mules, and coming back, all the way from Fort Larned to the state line, pretty nearly, it was dry, and as we went down there was no running water. It was standing in holes along the bank occasionally." (892.)

1865. Henry Hegwer, a witness, says:

"In 1865 I had a beef contract at Zarah. We drove cattle there in the fall. There was some water in the river when we came, but along in the spring we had to take them away from there and drive them up the Walnut river for water. There was not sufficient water for stock there in the fall without digging for it." (750.)

William Mathewson, of Wichita, produced by the State of Kansas, on cross-examination says:

> "No, I don't think the river was dry in 1865. It might have been so dry that it didn't run, but it stood in pools. I think there was a time probably when it was dry in 1865, that is, no continuous flow." (2154.)

1866. Deane Monahan, already referred to, connected with the United States army from July, 1856, was on the way to Fort Stanton and went along the river in 1866, and accompanied a Russian prince on a hunt along the Arkansas. He says:

> "I crossed the river every day during that time at least twice. The river was then very low, so that you would find only a little trickling stream occasionally, and again there would be no water running, but water holes all along. It was almost dry. The sand was wet, but there was very little running water—a little small stream here and there. You could wade through them without the water coming over the top of the shoe anywhere. That same condition existed all the way up to Fort Lyon during that trip. There was a little more water perhaps toward Fort Lyon as we went up the stream than where we first struck it; that is, it appeared to increase as we traveled up the river. On that trip I passed over the same ground that I did in 1861, from Great Bend to Fort Lyon. I think perhaps it was in the latter part of October." (785.)

Harley Sanderson, a witness, was connected with the old Barlow & Sanderson stage line, and used to go along the river from Junction City to Bent's old fort. He says:

> "We moved onto the road in July, 1866. We were making trips up and down the river between these points, and I went over that road during that summer a number of times, staging. The river was dry in a good many places that year. There was no water in the river. * * * You would see riding along on the stage any number of dry places in the river, that is, where there was no running stream. There was no time during the summer when from rains or other causes there would be a flowing stream while I was there. I came onto the river, as you might say, in July, and from July until the next April there was no running water all the way down the river." (876.)

1867. Henry Hegwer, already mentioned, had a contract for supplying buffalo meat to the contractors of the Kansas Pacific road. He says:

> "While I was hunting there we often ran down as far as the Arkansas river. It was about the middle of August when we reached the river and we stayed there for nearly a month, and finally were compelled to leave there on account of the scarcity of water. There was not enough water for our stock. When we went there there was quite a little flow, quite sufficient for our use." (750.)

John Murphy, a witness, says:

"We first came upon the river at Great Bend the latter part of August or the fore part of September, I have forgotten which. As to the condition of the river from Great Bend, Kansas, to Fort Lyon, Colorado, for a long distance, probably nearly up to the Colorado line, the river was about in the condition as I said. You could walk across it dry shod most any place. There was nothing in it but those narrow rivulets running through the sand, that you could step across at any place. There appeared to be a greater volume of water in the river west of the state line. We came west to Fort Lyon—that is the new fort." (934.)

Charles Bobbenreith, a witness, says:

"I saw the Arkansas river in Kansas first at about the middle of May, 1867. I was out with General Hancock's expedition at that time when we struck the river at Great Bend. At some places where we camped upon it we would strike water and in some places we would not. In some places we had to dig down in the sand for water. We kept along up the river from where we struck it as far as Fort Dodge. There were places along the way where there was no running water. There were pools of water here and there." (973.)

1868. F. W. Swanson, a witness, speaking of the Arkansas river, about twenty miles below Fort Dodge, says:

> "It was in the fall of the year. That was the first I saw of the Arkansas river. In reference to running water in the Arkansas river, there wasn't any to amount to anything. There was no running water at that time. We just found water there in pools. We camped on the river for about a week, and hunted up and down the Arkansas river, mostly on foot."

John Gores, a witness, says:

> "In 1868 I was at Fort Dodge, in Kansas, soldiering, and was stationed there about two years. I had occasion to see the Arkansas river repeatedly in 1868. I saw it and crossed it quite often, up and down. I crossed it just at Dodge, and below there too. There was water in it most of the time then, in 1868. I went farther down from Fort Dodge on a buffalo hunt and came down to Great Bend and crossed the river there dry in that year without any trouble. I expect it might be eight or ten miles from Great Bend where I crossed it dry. * * * What we called Great Bend then is now Larned. There is where I crossed the river." (946.)

William W. Jones, speaking of the Arkansas river, says:

"At the point we crossed it in 1868 at Wichita, there was possibly a little flowing water running in channels along. There was no place where you could call it a general current. It was just a kind of seepage from one place to another." (959.)

Charles Bobbenreith, already quoted, says:

"I saw the river again in Kansas in 1868. When I left Fort Harker I struck the Arkansas river at Larned and came right up the river by wagon. The water was very low. In some places there was no water at all. * * * There was no running water at all in some places. I think we struck a constantly flowing stream first, probably forty or fifty miles east of old Fort Lyon, and we followed the river up from there as far as Pueblo and there was a flowing stream all the way up." (973.)

1869. General Frank B. Baldwin. General Baldwin at the time of testifying (December, 1904) was a brigadier general of the United States army, commanding the Department of the Colorado. In 1866 he was first lieutenant in the Thirty-seventh infantry of the regular army, in command of a company, and a little later, up to 1871, in the capacity of quartermaster, had charge of transportation and shipping along the Arkansas river. He says:

"I have crossed the Arkansas river innumerable times almost all the way from

Pueblo down to Great Bend, and at Wichita, with troops and wagon trains, and have traveled along its banks during those years. We couldn't get away from the river. In marching out from New Mexico we had to keep to the banks of the Arkansas. Between Fort Zarah and Fort Larned the channed of the river was very often a great,wide, sandy bed, with no appearance of a river or anything of the kind, and then again we would find it probably for some miles running water. The banks are always low. There were no precipitous banks at all. I think I can describe the appearance of the Arkansas river a great deal better by repeating what Senator Depew once said about the Rio Grande—that it was the only river he had ever seen where the sand was on top and the water underneath. I don't suppose there is a month of the year in which I have not crossed the Arkansas river or traveled up and down its banks. Sometimes without warning a tremendous flood would come down the river that would tie us up so that we couldn't cross it. I have been tied up that way as many as five days at a time, and at the end of that time the water would almost entirely disappear. There would be no water there at all. * * * I have tried to cross the river several times with wheels, and it was not infrequent that we would have to dig our wagons out of the sand. It would turn dry and the least wind would keep the sand moving. If we had the

troops, even with foot troops, we would march in two lines the width of the wagon, back and forth two or three times, until we got it treaded down so that the water would almost appear on the surface, and then it would be packed hard enough so that the wagons would go over it without any trouble. It was on account of the quicksand in the bed of the river, and as we treaded it down the water would come up and the wet sand would carry the wagons better. The conditions I have just spoken of in reference to the river being dry would extend for varying distances. Sometimes it would be twenty-five or thirty miles, and then again there would be a rippling of water on top and this water would rise almost invariably at night when the sands would be damp, and sometimes the water would come up and be flowing in the morning, but as soon as the sun came up it would disappear. This dry bed of sand extended all the way from Larned to Bent's old fort. After we got to Bent's old fort I never saw the river dry above. I should say that Bent's old fort was about sixty or seventy miles below the present town of Rocky Ford." (744, 745.)

Edward L. Berthoud, already quoted, says:

"I next saw the river in 1867. I meandered the Arkansas river for the United States government from Pueblo east about fifty miles. I think the exact length of the

line was forty-two miles, but I had to go a little beyond that. The water was pretty low. We crossed it several times dry shod. That was in the winter from about the first of February until about the end of March."

F. W. Swanson, already quoted, was in the employ of the government at Fort Dodge. He says:

"As to the condition of the river in the fall of 1869, there was scarcely any water. There would be a little here and there in water holes. I walked across the river very often, sometimes three or four times in one day. We used to go out and kill ducks or geese, and I could walk across without getting my feet wet, most of the time. There were little pools of water here and there in the river. These pools were not connected with one another by running water in the fall." (801.)

1870. William A. Perry, a witness, says:

"I didn't see the river right at Wichita, but I saw it above Wichita, from a point seven miles above to twenty-five or thirty miles above Wichita. There was very little running water in the river at that time. There seemed to be some pools or depressions in the river bed that were full of water, but very little running water. It was in small, narrow streams like. There would be a strip of water and a strip of sand, and there would

possibly be more water there in the morning than in the evening. In the cool evening the water would rise more, but I don't think it was over five or six inches deep that I saw the running water there. That was the condition all the way along the distance that I saw it." (793.)

John R. Sitlington, speaking of the last part of June and first of July, in going up the river from Great Bend to Pueblo, says:

"We watered the cattle from the holes along the Arkansas river. Sometimes there would be running water and again for miles there wouldn't be any in sight. There was a scarcity of water in the river. There was not a great deal. Sometimes there would be for a mile or two at a time that there would not be any in sight, then there would be holes where the current when the river was up had washed them. There would be holes of water standing there." (834-5.)

S. J. Capps was on the Arkansas river in the fall of 1870. He says:

"During those two months I was on the river from about fifteen or twenty miles above Fort Lyon to thirty or forty or even fifty miles below it, and my recollection is that there was no running water in it at that time. There were holes of water sometimes extending quite a distance, and then again there

would be quite a distance where there would be no water. A chain of pools sometimes would extend quite a little piece, and then again there would be a dry place where there was a sand bar and the water there sank and came out farther down. But often we traveled quite a distance, for a mile or two, without any water." (1010.)

1871. General Baldwin, already quoted, further says:

"I remember one year the buffalo hunting for water. I think it was in 1870 or 1871; I would not be sure about that. I had a big train at Fort Dodge going down to Fort Supply with it, and we had to dig for water at Fort Dodge. I camped about three miles down stream from the post and the buffalo were apparently crazy for want of water. We dug these holes and we could scarcely keep them from the holes and get our mules down there to water, on account of the buffalo crowding in. That was on account of the scarcity of water." (745.)

Robert Roberts was on the river in the fall of 1871, and in the vicinity of Hutchinson. He says:

"At that time I was at and about the river perhaps a week more or less. I went up and down the river from that point maybe six or eight miles; then I went out in the country some. I couldn't say there was any

flow of water in the river at all when I saw it. There didn't seem to be hardly any on top. There were pools here and there, but I couldn't say that I saw any running water at all. I didn't see it running very much anyhow. It was in pools. I saw quite a lot of holes. Hardly any little runs from one little pool to another. I crossed the river at that time on foot and didn't take off my shoes nor get my feet wet. I crossed it dry shod." (790.)

S. S. Smith, a witness, says:

"We went down the river a considerable distance to find one of those pools. In doing so we drove right along down the river. We had been at Las Animas, and there was a little water there, but where we left the river about twenty miles below Las Animas there was not a drop of water." (881.)

H. M. Fosdick, a witness says:

"I crossed the river with cattle coming from Texas in 1871 at a little village called Park City, a few miles west of Wichita, ten or twelve miles, as I recall. We crossed there and followed up the river. That was in August or perhaps the latter part of July. There was some water in the river for cattle where we crossed. Plenty of water for the cattle. As we got up farther the water got less. I think after we left Cow creek there was no

water sufficient to water the cattle. There was no running water except, as I remember, at Walnut creek. I think that was its name. It came in there and flowed a little water; but that soon lost itself in the sand after it got into the Arkansas, and there was no water in the latter river except in deep holes, and it hadn't the appearance of having had any water. * * * There were stretches along there where there was no flowing water, from this last creek, the Walnut, I think it is. That is about old Fort Larned. There was no flowing water from there to Fort Dodge. That creek may be the Pawnee creek instead of the Walnut. Anyhow it is the creek that comes in near where Fort Larned was then. My recollection is that we found that dry condition of the river, without flowing water, for about fifty or sixty miles." (888-889.)

Humphrey Best brought up a herd of cattle from Texas in 1871, and struck the river about the middle of July, a little above Wichita, and then followed up the river for a hundred miles. He says:

"At first for a day or so it was dry, then we had plenty of water. By that I mean probably a foot or two in depth where we crossed it, and I guess maybe a hundred feet wide. After we got up three or four days' drive it was a pretty difficult matter to water our cattle. We would have to travel along the bed of the river quite a ways to get

sufficient water. We found several places for a day or two where it was dry, and we had no water except in pools along where there had been little whirls in the river or low places, and there was no running stream. The water seemed to be in the sand and stood along in pools like." (902.)

John J. Donahue, a witness, says:

"I camped on the river during 1871. In that year our home ranch was at old Fort Aubrey; that is located four and a half miles east of Syracuse. In the fall of 1871 the river was practically dry. You could cross it with a pair of boots and not get your boots [feet] wet if the boots didn't leak. I crossed it at Fort Aubrey and between there and Syracuse at different places. I lived right on the river that year and traveled up and down it all the time." (951.)

William W. Jones, a witness, speaking of the Arkansas river from the vicinity of Ellinwood, below Great Bend, and from there up the river, says:

"In the early part of that season there seemed to be a liberal flow of water, but by the latter part of August it seemed to get pretty scarce and you might say that water just simply stood in holes along until we got up to where Garden City is now. And that condition continued until the next spring. It didn't improve any." (960.)

George W. Thompson, a witness, testifies to driving cattle along the river in 1871. He says:

> "I found the river very low all the way from the state line down. There was some water at the state line, enough to water on, but as we went down the water got lower and the river got wider and sandier. It was dry in places and running in rivulets along a foot or so wide in places and a few inches deep, and then in a quarter of a mile from there perhaps there would be holes, and then below that you could cross over these rivulets without wetting your feet. Sometimes two or three of those rivulets would run only an inch or so deep." (987.)

J. O. Packer, a witness, testifies to driving cattle along the river in the vicinity of Fort Dodge. He says:

> "I came from the railroad, across from Fort Hayes to Fort Dodge to join the herd, and from there I followed the river up to Las Animas. It was in the latter part of September or the first half of October. I remember that for two or three campings it was about dry. It was running a little in little streams maybe a foot or so wide, but you could walk across the narrow river bed without getting your feet wet; and we camped one night, I know, on the bank of the river, and the cook, to get water,—well, there was water running in small rivulets—dug a hole in the sand under the bank to get water for the camp." (989.)

1872. P. F. Lull, a witness, says:

> "I saw the Arkansas river in Kansas in 1872, from Fort Zarah clear up to Fort Dodge. Fort Zarah was near the present town of Ellinwood. We came by wagon and followed the course of the river. The water stood in pools in the river. There was no running water. I don't recall striking any running water, except there was a little when we got up to Fort Dodge. We got water for our stock in some places by shoveling up the quicksand and keeping it moving so as to let the stock drink, and did that often to get water to cook with. We did this in the bed of the stream. We went over there in June. I was leaving Salina, Kansas, and went over in May. We reached Fort Dodge in June, and I was there all summer." (865, 866.)

J. R. Foster, of Wichita, says that in 1872 he had a contract to put up hay along the river, and had to dig holes in the sand to water stock. (1654.)

Robert Roberts, of Denver, testifies that he was on the river in 1872, near the present state line between Kansas and Colorado. He says:

> "The water was very small then. It was still getting smaller and we had to sink barrels to get water for our camp. We couldn't get enough water in the river. There was a little water there, but we had to sink barrels in the sand in the bed of the river so that we could get it. I stayed there until

pretty near Christmas. It seemed as though the water was getting less all the time. There was no running stream at that time near the state line that I could see from the time I went there until I left." (791.)

J. O. Albert, a witness, says:

"Three years later I was down on the Arkansas river as far as Coolidge. That was in August, 1872. And at that point there was no stream at that time. At Lamar or a little above that there was a little running water." (1019.)

1873. James Gallena, a witness, says:

"The river in 1873 was as dry as a board where we crossed about three miles below Wichita." (810.)

Henry McAllister was on the river some distance below old Fort Lyon, in the latter part of July, 1873. He says:

"At that time—I was nearby there three days and crossed the river three times on foot. It was dry. On the south side of the river where the sand was something lower than it was on the north side, where the current had been just before it went dry, the sand was moist or wet, but there was no water running in it when I was there." (822.)

M. H. Murray, a witness, says:

"In 1873 at a point about six miles west of Granada the river was dry in the month of

October. There were holes, I suppose, in it, but at the point I speak of Mr. Graham was working with a couple of scrapers and teams and some men making holes to water his cattle. That is what called my attention to it. This was about twenty miles from the Kansas state line, in Colorado." (929.)

Henry B. Sager, speaking of September, 1873, says:

"I rode in a stage for a distance of fifty or sixty miles down the river. There was at Pueblo at that time what I would call a reasonably good supply of water for a river of its size, but when I came to Fort Lyon I wouldn't think there was half as much water, apparently, as there was at Pueblo, but it was wider out. * * * There was a little channel here and a little one there in places. I didn't particularly notice it where I struck the railroad, only going down on the stage I noticed that there was less water the farther down we went. After leaving Granada I was continually looking out on both sides of the train, and I distinctly remember somewhere between there and Dodge City, where we were running immediately parallel with the river, that the river was dry. There was just a wide sand bed across it and the river bed was sandy and dry except in a few instances where there would be a pool, say as long as this room, just standing still." (982.)

On cross-examination this witness says:

> "I found plenty of water at Pueblo. Not so much at Fort Lyon; perhaps one-third less. By the time we got down into Kansas there was no running water. I suppose it had soaked down under the sand or evaporated, one or the other. But the whole amount that I saw flowing in the river between Pueblo and Granada couldn't have evaporated, of course." (983.)

S. N. Tucker, of Wichita, Kansas, a witness, says:

> "The first three or four years I lived there the Arkansas river used to go dry within a quarter to half a mile from the mouth of the Little river [Little Arkansas], and it was dry, except in pools, now and then, and up as far as Swan's Island. Well, I saw it dry that way in 1871, 1872 and 1873." (1680.)

C. S. Longstreth, a witness for the State of Kansas, testifies on cross-examination as follows:

> "I think it is a fact that at Hutchinson, Kansas, during the period from 1873 on up to the present time the river has been dry at various times during the season in almost every year or the majority of them. I know I very frequently found it dry there." (586.)

Rueben Irwin, of Las Animas, Colorado, says that he was on the river several times in 1873 at different places from Pueblo down to Garden City, Kansas. He adds:

"I was there along from September to January. The water was low in the river then. In some places there was no running water and in other places it stood in holes. Near the state line there were two or three different stock men had to scrape to get water for their stock. I mean they had to use a team and scraper. I remember one place they scraped for water was eight miles above Granada, by Jim Crane's place. I think it was in September or October." (931.)

1874. General Baldwin, already quoted, says:

"In July, 1874, what was known as the Indian Territory expedition against the Kiowas and Comanches was mobilized at Fort Dodge, and we crossed the river there dry shod. There was not water enough in it to fill a canteen; that is, on the surface; that was in July. We crossed it right opposite Fort Dodge." (746.)

Henry Hegwer, already quoted, further says:

"I homesteaded on the Arkansas river for six months, in 1874 I think it was. This was six miles west of Hutchinson. Part of the land I farmed lay across the river and I had occasion to cross it every day. I lived there several years; the balance of the time I lived on the river at Hutchinson, and during the years I have mentioned I had occasion to see the river every day. In the spring of the year there was generally a fair flow of water, sometimes bank full, and in

low places it would overflow. In the fall of the year there never was a time but what you could walk across it. I don't remember a year but what you could walk across it without wetting your feet." (750.)

William H. Brinkman, a witness, says:

"I saw the Arkansas river in the early years so that there was no flowing stream in it. I think the first time was in the fall of 1874." (1570.)

On cross-examination this witness said:

"Yes, sir, the river went plumb dry in 1874, and perhaps was dry from August, 1874, up to October of the same year. Yes, sir, that was the grasshopper year." (1572.)

As to the year 1874, the witnesses for the State of Kansas also gave abundant testimony, as per the following citations:

John W. Harrison, of Colwich, Kansas, on cross-examination, says:

"In 1874 the river was practically dry at my place. I have never seen it as dry at any time since. It came pretty close to it several times, but I can't give you the dates." (278.)

H. H. Hansen, of Wichita, says:

"In the year 1874 the stream dried up partially. There were some water holes in it." (287.)

Mr. Hansen was a witness for the State of Kansas, and on cross-examination says:

> "The river was entirely dry during a portion of the season of 1874 in the fall of the year. I think the condition was about the same between Wichita and Hutchinson, all over, at that time. So far as I traveled up and down the river it was dry." (289.)

Robert N. Wright, already quoted, on cross-examination, says:

> "In 1874, if that was the grasshopper year, it was a very dry year. The river may have been dry about the year 1874, during a part of the season, for one hundred or one hundred and fifty miles, including the river by Dodge City." (448.)

C. S. Longstreth, already quoted, further says on cross-examination:

> "I think probably through August and September in 1874 the river was practically dry at Hutchinson, and from there down. I couldn't be positive about that, though, but that is my best recollection. In 1874 was the grasshopper year. I couldn't say anything positively about the condition of the river at Hutchinson. I know it was dry very often." (586.)

William Mathewson, of Wichita, already quoted, says:

> "It was not a continuous flow in 1874. It stood in pools." (2154.)

Frank Bridgeman, of Wichita, on cross-examination, says:

"Yes, sir, it was dry in 1874, the grasshopper year. As to its being dry for two or three years after that in the early days, I would say there was a time or two when the river was dry, but I couldn't tell you the dates." (2194.)

1875. Samuel N. Johnson, a witness, says:

"In the fore part of July I was near Fort Lyon, and I remember that about the 20th the river had gotten very low. There came a rainy spell. It rained about four or five days, and there seemed to be a general rain all over the country. The river got very high and overflowed its banks. After that rain was over it cleared up and the river ran down very rapidly, so that about the first of August it was scarcely running at a point on the river about seven or eight miles above Granada, near the mouth of what we called Wolf creek at that time, and there was very little water running. Of course, there were holes where there was considerable. I was down between that and the 15th of August, about ten or twelve miles below Holly, and down there at a little island in the river the river was dry completely—no running water. There was some water in holes. I know we considered the water in holes too stagnant to use and we dug for water in the sand in the bed of the stream, to get water for camp-

ing purposes. I was along there about a week and there was no increase of water during that time, and then I came back up the river to Pueblo and there was running water a little above Las Animas." (983, 984.)

Claudius V. S. Hart, who was rounding up cattle near the state line in 1875, says:

"At that time, in 1875, there was very little water in it. Sufficient for stock purposes, though. In some places it would be running a little and in other places there would be standing water in pools. In some places there was no water at all between these pools, and in other parts of it they were connected by little streams, and in some places the bed was absolutely dry." (998.)

Miguel A. Otero, who at the time of testifying was governor of the territory of New Mexico, says:

"I lived in Granada, Kansas, in 1873, and until 1875, and went up to La Junta. I have frequently gone hunting in those years along the Arkansas river, and I have walked across it frequently there without wetting my shoes. I have hunted ducks in that country over toward Holly and below and at La Junta also. Of course, in flood seasons you could not swim a horse across sometimes. I have walked across it several times—frequently." (1079.)

1876. J. D. Sidlow, of Dodge City, Kansas, says:

> "The first time I saw the river was in the latter part of February or the first of March, in 1876. I got off at Kinsley, and during the first day I was there I went down the river and saw it at that time. It was very low. I saw a man go across it on foot. He said he hadn't gotten his feet wet going across. There was some water flowing in the river, but very little. There were small channels, yes, sir, but a man could walk across without any trouble or without getting his feet very wet. It was not over boot top deep." (1510.)

H. Juneau, of Dodge City, a witness, says:

> "I first became acquainted with the Arkansas river in Kansas in 1876 at Wichita, about the middle of August. In August, September and October of 1876 the middle of the river was dry. There were two little streams on both sides that you could step over. It was not over a foot deep at any place." (1533.)

1877. We ask the attention of the court to the description of the Arkansas river given by Lieutenant Colonel Richard Irving Dodge, in a book entitled "Plains of the Great West and Their Inhabitants," published in 1877. (See quotations in the record.) (638.)

George W. Thompson, a witness, whom we have already quoted as to the condition of the river in 1871, further says:

> "In 1877 I drove these cattle to Great Bend and grazed and held them there for two or three months on the open market before shipping. The river that year was low. We grazed our cattle by Great Bend, on the south side of the river mostly, and it was about as I have previously described it." (See above under 1871.) (987.)

Walter N. Houser, a witness, says:

> "I saw the Arkansas river in eastern Colorado and western Kansas in 1877 first. I was engaged in rounding up cattle on the river that year, from Rocky Ford down to the state line, and along about the first of September on until the first of October. At that time there was very little water in the river. It was mostly confined to water holes. There were places where there was no running water." (993.)

Claudius V. S. Hart, already quoted as to conditions in 1875, further says:

> "I am not positive about the river in 1876, but in 1877 it was very dry. I was down there in the May round-up. That was what we called the spring round-up. And then there was considerable water. But in the fall hunt, which commenced about the mid-

dle of August, and from that on, we found very little water, and by 'very little' I mean about the same as I have described in 1875. There were places where there was absolutely no water at all." (998-999.)

S. J. Capps, already quoted as to conditions of the river in 1870, says:

"I shouldn't think there was much difference in the amount of water in the river in 1877 from what there was in 1870. There was still some water there, but not a continuous stream. There were stretches where the river bed was entirely dry." (1011.)

H. Juneau, of Dodge City, was living in Wichita in 1877. He says:

"In 1877 I had a shop on the land adjoining the Manhattan hotel in Wichita. My shop was about two feet high from the ground, and the water came in and covered the floor of my shop about six inches. That was in May, 1877. The following September the river was dry. That shows the two extremes in one year, you understand." (1536.)

This witness, on cross-examination by counsel for Kansas, says:

"I tell you that I saw the river perfectly dry at Wichita twenty-eight years ago. You

could play marbles in the center of it. As to whether when these ditches were dug there was a prospect of ever getting water enough to operate them, I will say no, there was not, as a matter of fact. There wasn't to operate them the year round, because there was never any water in the river the year round. Never. You come here in August, September or October and you will see a dry river, but no more so than twenty years ago. That is the point I want to make." (1543.)

S. S. Dickinson, of Larned, Kansas, a witness for the State of Kansas on rebuttal, says, speaking of the Arkansas river:

"In 1877 it was dry about sixty days in the summer and fall of that year." (1992.)

1878. Walter N. Houser, already quoted as to the year 1877, further says:

"I was next on the river in eastern Colorado in September, 1878, and if anything the river was a little drier than in 1877. I think the description I gave as to 1871 [1877] would hold good as to this year. On this latter trip I was taking a bunch of horses to where Oklahoma is now, on Beaver creek, from Denver. I think we crossed the river right in below where Rocky Ford is now." (994.)

R. E. Twitchell, of Santa Fe, New Mexico, says:

> "I have been acquainted with the Arkansas river in Kansas and Colorado since 1873 at Dodge City and near Nickerson and all along the river from about old Fort Lyon to Pueblo. I have seen the Arkansas river dry near Nickerson; that is, no flowing stream; that was either in the spring of 1877 or 1878. I have seen it dry a great many times along about Granada and about Coolidge and through there. * * * I have seen the Arkansas river in the last four or five years a raging torrent, and at other times I have seen it when there was no water flowing in at all; and that is true not only in Colorado, but away down in Kansas. I think the character of the Arkansas river is that sometimes there is a little water and sometimes no water." (1102.)

S. Gallagher, Jr., a witness for the State of Kansas, testifying at Dodge City in August, 1904, on cross-examination, says:

> "I can't say as to the river being low in the month of September in the earlier years. Sometimes it would go down. I have seen it when there was but very little water. I have seen the river dry at this time prior to 1891, so that there was practically no water running in it. I believe that was in 1878. I have no recollection of any other year. I was not

on the river in 1874. I was in Illinois. I came here in 1877." (477.)

C. S. Longstreth, a witness for the State of Kansas, already quoted as to the years 1873 and 1874, further says:

"I remember well, in 1878, anyway, the river was dry at Hutchinson. I had occasion to cross it a number of times at that time. I drove across it. It was dry. It had not a particle of water in it." (586.)

E. E. Frizell, of Larned, and mayor of that city, says:

"I believe the first time I ever saw the Arkansas river completely dry was in June, 1878. It must have been about the middle of June." (1564.)

1879. The "Ford County Globe," published at Dodge City, Kansas, in its issue of July 22, 1879, has an article headed, "High and Low Tides," and in that article appears the following statement:

"The river presented a series of unusually interesting phenomena during the present week. First it suddenly dried up and remained so for some 24 hours, when, lo! it as suddenly assumed its normal condition. Again it dried up, and at the moment we pen this, it is to be found in that condition. Thousands of fish were caught in nets improvised for the occasion, which had become land locked in little pools on the bars, and

thousands died in the intense heat engendered in their limited quarters." (639.)

Harris A. Newton drove a flock of sheep down the river in August, 1879. He says:

"From Las Animas down to Fort Lyon and Granada, and down to the Kansas line, or a little below, say about Holly, we seemed to get plenty of water in the river most any place to water them. From there on we had trouble about water. By nine or ten o'clock in the morning we turned in on the river with the sheep, driving them down in the river bed on the sand until we found water. There was just a little running water in places. In the rest of the places it was dry. I remember one day we had no water for the sheep. We couldn't find any water. After nine or ten o'clock in the morning we drove all day in the river bed. I remember we found water next day somewhere. When you drive sheep they ought to have water every day. We couldn't find water even in holes on one day, but there was only one day on the trip when we had no water for the sheep. We would generally find a little running water. The bed of the river was all dry. It was a little damp sometimes, but just a bed of sand. All dry sand and no water in the holes and no running water." (788.)

Oliver B. Stauffer crossed the river in February, 1879, on horseback, at a place known as Raymond,

Kansas, the water at that time being about knee deep to the horse from bank to bank. He further says:

> "In July of that year there was no running water there at all; there was only water in the depressions. * * * There was no water in the bed of the river outside of these water holes, and as near as I recollect, it continued more or less dry up until in October; then we had some pretty heavy rains and there was more water in the river." (904.)

H. W. Potter came up the Arkansas river in the latter part of May. He says:

> "I struck the river at Lakin or a little below and we worked up the river to Las Animas. The distance is in the neighborhood of a hundred miles. Lakin is in Kansas. The condition of the river at Lakin was dry, with the exception of water standing in the holes where it had washed out deeper than at other places. We found water in those holes to water our herds until we got as far as Granada; there the river was running a little, and from there on up it was running more, up to Las Animas. I don't think there was any running water below Granada at that time." (919, 920.)

C. P. Thoman lived at Wichita in 1879, and started on a trip up the river to Dodge City in April, and returned during the same month. He says:

> "The country at that time was very unsettled, except at certain points, and it was

very difficult to obtain water for our horses, and we generally managed when we could to go down to the river and water them, and in one instance I remember we had to dig down in the sand to get water. In some places it would be running a little in a small stream, and we found pools. It was quite low at Dodge City, and right at Wichita during the time we were there it rained for nearly three days and there was some water came down, but after we left Wichita about ten miles there was no more rain and there was practically no water in the river from there to Dodge. The Little Arkansas river brought most of the water that was in the big river at Wichita. The water there in the river came from local rains, as it was practically dry until the rain came." (939.)

W. J. Johnson, a witness, says:

"I crossed the Arkansas river in 1879 at Wichita, when it was practically dry. That was during the summer and fall season. And that condition continued for a number of weeks or months, I should say for a couple or three months perhaps, at that time. That was below the mouth of the Little Arkansas river. What water was there came from the Little Arkansas. The Little Arkansas is the larger stream of the two in the summer time." (972.)

S. J. Capps, already quoted as to years 1870 and 1877, testifies to a similar condition in the vicinity of Las Animas in the year 1879. (1011.)

J. O. Albert, a witness, went down the river, starting from Pueblo on the 20th of August, driving two thousand sheep. He says:

"There was water in the river down as far as Lamar, and then we didn't have any water to amount to anything. Once in a while there was a pool of water or something like that. We had quite a time after we left Lamar to get water for the sheep. We kept very close to the river and when there was any water we drove in and watered them. We crossed the river at Coolidge and kept on the north side as far down as Syracuse. There we didn't find any water at all and thought we would have to turn back, but we kept going. At one time from the line to Syracuse, a distance of perhaps thirty miles, we didn't get any water at all. After we got there we dropped into the river, or beyond there perhaps three or four miles. We dropped right into the bed of the river and knew if there was any water we would catch it. We drove there three days without getting any. We drove the sheep right in the bed of the river. * * * We stayed right in the bed of the river, and by 'milling' them around on the third day we got a little water for the sheep. Their tramping in the sand, going around and around, would pack it down until the water would rise where they would travel. There was no running stream during the three days we traveled. There was not even any water standing in holes. We found no run-

ning stream until we got to the Pawnee." (1020.)

John D. Sidlow, already quoted as to the year 1876, was a homesteader in the vicinity of Dodge City in the seventies. He says:

> "I was on this homestead I took up about eight years, and I saw the river frequently during that time, and nearly every year it would get very low so that you could cross it without any trouble, especially in the year 1879, when there was no water in it whatever. It ran entirely dry that year, yes, sir. Nearly all that summer it was perfectly dry. I think there was a little water in it during the fall, and there was very little water in it until along in July of 1880." (1511.)

James M. Imel, a witness in rebuttal for the State of Kansas, on cross-examination says:

> "I crossed the river on the 4th day of July, 1879, and it was up about to the axle of the spring wagon, but I went down east along in October, and if I remember right I struck the river there at Kinsley. I think the river was dry in October." (1971.)

Clyde B. Johnson, of Larned, Kansas, testifying in rebuttal for the State of Kansas, says that he saw the river dry in 1879. (2012.)

J. P. Worrell, of Larned, Kansas, testifying in rebuttal for the State of Kansas, makes the following admission on cross-examination:

"Concerning the year 1879, as to whether there were miles of the river in this county at that time where there was no running stream, I will say, I have that recollection. In 1883 that is a fact. I know that because I drove a herd of sheep right up the river. Well, from here to Garfield at any rate there were miles of it in which there was no running stream. That is as far as I went." (2022.)

1880. Oliver B. Stauffer, already quoted as to the year 1879, further says as to 1880:

"We struck the river below Raymond, probably two miles, and drove down the bed of the river for possibly three miles, until we struck the line running east and west on which we lived, and it was very windy. There was no running water in the river at all. I didn't see any water holes on that trip. * * * In this description of the river I am referring more particularly to the years 1879 and 1880. I saw the river dry at other times, between 1880 and 1893—I think as many as four or five times at least. There may have been some water holes. It was probably not entirely dry, so much so as it was in 1880. No, there were times there was no running water." (904.)

William W. Jones, speaking of the river east of the mouth of the Purgatoire, says:

"The extremely dry year I experienced was in 1880, and they didn't have much wa-

ter this side [east] of the Purgatoire, and from there on down the river went dry nearly the whole year round. 1885 was not much better than 1880. 1880 was the worst year by odds that we had." (962.)

Berry W. Nolan, of Garden City, went down the river in the vicinity of Cimarron in July. He says:

"As we came down the river sometimes we would find water and at other times we would have to dig down in the sand to get it. I know one or two times we had to dig down to get water, and at other times there were little streams of water running along. There were times on that trip, yes, sir, when we had to dig to get sufficient water for our stock for camping purposes. Well, I don't think there was water at those places or we wouldn't have to dig for it. If there was we didn't see it. I remember distinctly digging wells in the sand to get water, and I am satisfied there was no water there or we would not have done that. At other points there was a little stream of water running here and there, winding around through the sand." (1466.)

William H. Brinkman, already quoted as to the year 1874, further speaking of the Arkansas river, says:

"I think it went dry again in the fall of 1878 or the summer of 1879 or 1880. I think it was dry most of the winter, until in May of the spring of 1880, and since that time,

well, it might have been dry for a short time. No, sir, I never have seen it at any time when it was dry for so long a period as it was in the fall and winter of 1879-1880. That was the longest dry spell we had." (1570-1571.)

W. B. Norris, of Great Bend, Kansas, says he has been acquainted with the Arkansas river for twenty-five years, and that his farm adjoins the river. He says:

"When I first saw the Arkansas river it was dry. That was in 1880, in the early part, and at the point at which I saw it dry was about two miles east of Great Bend. I was along the river near Walnut creek, and when I saw the river then there was actually no running water for five or six miles. Yes, sir, I saw it dry again in the earlier years. From 1880 on, say for ten years, I think it was usually dry outside of flood periods during certain times of the year." (1586.)

S. S. Dickinson, a witness called for the State of Kansas in rebuttal, and already quoted, testifies on cross-examination as follows:

"And coming to the year 1880, as to whether it is a fact that during a part of the summer and fall of that year the river was practically if not entirely dry, except for water in holes, I would say, yes, sir, from along in August or September until in the early winter. That is right." (1992.)

1881. The court will find a remarkable absence of testimony as to a dry condition of the river in the year 1881, but the explanation will be quickly found by reference to Intervenor's Exhibit No. 17, which is a government record of the rainfall at Dodge City, kept consecutively for thirty years. An examination of that exhibit will show that 1881 had the greatest rainfall recorded in that period of thirty years. In the month of May alone in that year there fell almost thirteen inches of rain at Dodge City, while the rainfall in the months of July, August, September and October, fairly well distributed, was 147 per cent. of the normal amount.

1882. George Gilbert, a witness, was on the river at Garden City in August, 1882. He says:

> "I didn't see any flowing water in the river at that point. There were some pools in deep places in the sand bars, but I didn't see any water flowing, and I think I was in position to have seen it if there was any." (852.)

D. E. Hogbin, of Garden City, testifies:

> "I was frequently in Dodge City, Sterling, Ellinwood and those places, and I noticed the river more particularly at Dodge City along between 1879 and 1883, and as to noticing it during the dry season of the year, it was dry there anyway. I know that very particularly, and that time was along about the first part of the '80s, I think. Maybe it was 1881 or 1882. Yes, sir, at points during

those years I saw the Arkansas river absolutely dry, without a current flowing in it. And those points were at Dodge City and along by Ellinwood and down in there. It seemed to be a drier stretch down there than it was in some places west. Well, I have noticed it practically dry every year. At some time during the year it would be what we would call practically dry." (1472.)

1883. D. E. Hogbin, already quoted as to the year 1882, further says:

"I noticed it [the Arkansas river] particularly in April, 1883. It was dry then so that you could step over it. That was east of Kendall and along there. Yes, in those early years I noticed that a number of times the river went entirely dry along at those points. There were stretches where the water didn't flow. That is what I mean by 'dry,' and in other portions there would be just a little stream running." (1472.)

George K. Lee, of Larned, Kansas, speaking of the river in that vicinity, says:

"I think about 1883 I used to drive cattle down there for three or four or five years. We used to take all of our cattle down there, and sometimes we found no water in the Arkansas river at all during those years, only in the little holes. At other times we found it pretty nearly bank full." (1547.)

J. P. Worrell, of Larned, a witness for the State of Kansas, produced in rebuttal, and already cited as to the year 1879, after having said that in 1879 there were miles of the river in his county where there was no running stream, then proceeds as follows:

> "In 1883 that is the fact. I know that, because I drove a herd of sheep right up the river. Well, from here to Garfield, at any rate, there were miles of it in which there was no running stream. That is as far as I went." (2022.)

We have here cited eight historical authorities and quoted the testimony of some ninety witnesses, showing the real character of the Arkansas river as a stream, and bearing united testimony to the fact of long stretches of barren sand with no flowing water.

In view of the contention made by the State of Kansas of a uniform good flow of water in the spring or early summer, which they call a "June rise," and in view of the claim that this "June rise" was, prior to the period of irrigation, a constant characteristic of the customary flow of the Arkansas river through Kansas, it is interesting to observe the times to which the various witnesses above quoted attribute their experiences as to the river being a dry bed of sand.

It will be found by reviewing the testimony above quoted that there is not a single month in the year at which some witness did not, during this period of time, find the river dry. And it is a very significant fact that the month of June is more frequently mentioned as showing this condition of dryness than is the month of May, or any month preceding it in the cal-

endar year, and more than the month of October, or either of the two months following it. July, August and September are the only months more frequently mentioned in this testimony than is the month of June, as showing this condition of dryness in the river. There are a number of these witnesses whose testimony is general, without the designation of specific months. The witness Hegwer, speaking of 1865, found the river to fail *in the spring* so that he had to take his cattle away. (750.) Harley Sanderson says there was no running water from July, 1866, until the following April. (877.) William W. Jones describes the condition of dryness in 1871, as continuing from the latter part of August until the next spring. (960.) And John D. Sidlow found the river dry nearly all the summer of 1879, very little water in it during the fall, and very little water until July, 1880. (1511.)

Speaking of general conditions on the Arkansas river, C. B. Schmidt, who had charge of the immigration interests of the A., T. & S. F. R. R. Co., commencing in 1873 and continuing through later years, says:

> "In regard to my familiarity with the Arkansas river, commencing with the year 1873, at first it looked very discouraging to me, and I found when I had people to show over the country that they always objected to that dry river, and they claimed that the general supposition that this was the American desert was shown by the condition of the river there. It was most always absolutely dry, and we had that to contend with always when we brought the settlers out. The river,

in fact, so far as my work was concerned, was a bugbear." (868-9).

The character of the Arkansas river, and the history of that stream before its waters were diverted for purposes of irrigation, is of the utmost importance in the consideration of the various questions that will hereafter arise in this discussion. We have, therefore, felt it our duty to collate and chronologically arrange this testimony and set it forth seriatim in this argument for the consideration of the court.

2. The evidence as to the character of the Arkansas river as an intermittent stream, and in dry seasons a "broken river," is further shown by the testimony of trained scientific observers.

Louis G. Carpenter at the time of testifying was state engineer of the State of Colorado. Prior to assuming the duties of that office he was, and now is, professor in the State Agricultural College of Colorado, and had charge of the Agricultural Experiment Station at Fort Collins, Colorado. For many years he has made a special study of subjects connected with the movements of stream waters, and with questions of irrigation. He has studied the movement of surface and underground waters for many years, in different parts of the world, and is especially familiar with the western United States.

Professor Carpenter says:

"The Arkansas river partakes very much of the character of the intermediate streams which I have described, such as Grape creek, Texas creek, the Fountain, and the Purga-

toire, in the fact that the upper reaches of the stream have constantly running water; then it runs out on the plains in a broad, sandy bed, and the stream then tends to disappear, the same as the creeks above named and others of like character. * * * The Arkansas might then be appropriately called two rivers, or a broken river. We have the upper end a running river, the lower end a running river, and between these two living streams we have a portion that has been, from time immemorial, dry from time to time. In the absence of irrigation the upper river would begin to dwindle at its exit from the mountains. There are such tendencies now. There are portions of the stream, as at Pueblo, where it becomes less. Irrigation modifies this tendency to some extent, by the return water coming in from springs. The decrease is therefore most marked below Lamar, and, in fact, so far as our measurements have gone, more below Coolidge, and quite rapidly from there on. The lower stream I have not seen dry, so far as my limited experience has gone, below the mouth of the Little Arkansas river at Wichita." (625, 626.)

We call the attention of the court to the many facts given by Professor Carpenter, to illustrate the character of this stream.

Willard D. Johnson, of Washington, D. C., is connected with the geological survey of the United States,

and has been for most of the time since 1879, and has been hydrographer in the hydrographic branch of the geological survey. He was introduced as a witness by the United States, the intervenor. He is familiar with the Arkansas river. Describing it, he says:

> "The Arkansas river is in Colorado and well out toward Kansas, but not reaching to Kansas, a perennial stream, falling short of the Kansas line, where it is normally an intermittent or dry stream, with a flow occasionally in floods. The Arkansas valley, however, coincides with the ground water surface along its course from a little back in Colorado well into Kansas. In central Kansas, or in the neighborhood of Dodge City, the ground water supplies that *normally* dry stream and makes a new stream, starting from the ground water and flowing eastward; so that the Arkansas river is really two streams. It is a stream drained from the surface waters of the mountains in Colorado, running eastward, draining out of the mountains and carrying its run-off until that run-off contributes to the sand on either side and evaporates. It largely evaporates. And, then, in Kansas quite a ways eastward, after a long break or intermittent stream or dry stream—normally dry stream valley—the river begins again by inflow from the water shed dipping to the valley from either side and flowing in in excess of the loss by evaporation so that it makes a visible stream again." (1223.)

Again this witness says:

> "I use the term 'intermittent stream' to make the distinction between that and a perennial stream—a stream with a constant flow. The Arkansas river from a little back in Colorado, well into Kansas, in the neighborhood of Dodge City, is an intermittent stream; that is, it is normally dry." (1225.)

On cross-examination of Mr. Johnson, he is asked about a book which he had written, entitled "The High Plains and Their Utilization," and about a map accompanying that book. The map referred to is in this record as Colorado Exhibit No. 23. On that map the Arkansas river is marked by dotted lines from a point back a little ways in Colorado eastwardly to the neighhood of Dodge City, and in this connection he says:

> "By dotting the stream, of course, for that distance, I put on record my opinion that it was normally a dry stream for that distance, but that, normally, it was a perennial stream, that it flowed continuously, nearly to the Kansas line, but not quite, and that it always had done so in recent geological times, and that it began again as a new river, with a new source of supply from the ground water in the neighborhood of Dodge City, and continued on with an enormous increase in volume from the ground water and the run-off combined." (1232.)

In reference to having upon his map made the eastern limit of the dotted lines in the vicinity of Dodge City, the witness afterwards testifies and says:

"The dotted lines on the river from about the Colorado boundary to about Dodge City indicate that in my opinion the river is most of the year round dry through that distance. I do not think those dotted lines very approximately designate the points at which the river is normally dry. I have simply expressed there roughly the fact that there is quite a wide belt, about that wide, over which the river normally does not flow. I think I have the terminating end too far west, to tell the truth." (1249.)

Again, this witness says, on cross-examination, in speaking of the river in the vicinity of Wichita:

"By going so far eastward we would almost completely eliminate the Arkansas river of Colorado, which is one river by itself, from the Arkansas river in eastern Kansas, which has another source of supply, so that we can disregard one part."

Professor F. H. Newell, chief engineer of the Reclamation Service of the Geological Survey of the United States, was produced as a witness by the intervenor. He had been present during the testimony given by Mr. Johnson, above mentioned, and he is asked as to his opinion concerning the Arkansas as an "intermittent river," and he says:

"My opinion is substantially in accord with that of Mr. Johnson. I think he emphasizes a little more strongly than I should the fading out of the upper river, but for the

purposes of study and description his idea, I would think, is substantially correct. There is a perennial river above, an intermittent river below, and then a perennial river still lower down.

"Whenever the upper river was in flood, and there was a considerable flood flow, the diversion of the upper waters would undoubtedly have an appreciable effect on the lower river. When the river was at its lowest stage, and it was possible that its waters would entirely disappear before getting down into the vicinity, say, of Garden City, presumably there would be very little effect from taking it out entirely in Colorado." (1266.)

Again, Professor Newell says:

"I got my impression from my study of the Arkansas river that it was what might be designated a broken or double river. My impression would be that it fades out or disappears farther east than the place given by Mr. Johnson. I think in his answers he had in mind the western end of the county in which Garden City is situated rather than the state line, and with that assumption I should say the river normally disappears a short distance west of Garden City, and my impressions have been that from Garden City easterly beyond Dodge City and Hutchinson until approaching Wichita, it was what might be classed as an intermittent stream." (1282.)

It will be observed that the study of the stream by the best trained scientific men, as well as the testimony of travelers and pioneers of earlier days, fully supports the proposition which we have been discussing as to the character of the Arkansas river.

As above stated, this proposition is so important as underlying the further discussion of this case, that we have felt that the testimony upon the matter should be systematized and massed, and be spread at large in this argument, but we call the attention of the court to the fact that the complainant has made practically no attempt to refute the testimony as to the historical character of this river from the earliest days down to the commencement of the period of irrigation, nor has it attempted to refute the testimony of the scientific men whose evidence we have above quoted.

In the light of this testimony, it seems strange that counsel for the State of Kansas should, in their brief (page 32) commence a discussion upon "The flow of the river," with such a sentence as this:

> "The flow of the Arkansas river, prior to the time when the waters were diverted for irrigation purposes in Colorado, about the year 1890, covering a period of time beginning with the earliest records, information or observation of witnesses, was as constant and uniform as the flow of the ordinary river."

We can only characterize such a statement as this as being utterly reckless, and showing a total disre-

gard of the vast mass of evidence which we have above cited, and which has never been refuted.

3. The only way in which the complainant in the submission of testimony remotely touched the subject discussed in the last section of this argument was by the attempted proof that the flow of the Arkansas in very recent years was on the average, exclusive of floods and high waters, less than in some earlier periods in the experience of the several witnesses.

For the purpose of such comparison of recent with earlier flow of the river, the State of Kansas introduced about fifty witnesses in the original submission of its case, and this became one of the important controversies to which testimony was directed. After the close of the complainant's original case, the defendant, State of Colorado, introduced some sixty witnesses, whose testimony upon this particular subject of comparative flow was directly contrary to the testimony produced on behalf of the State of Kansas, Thereupon, the State of Kansas, in "rebuttal," produced numerous other witnesses to the same point upon which their original evidence had been adduced, the new evidence being purely cumulative in character. We have made a motion to strike out this rebuttal testimony, insofar as it is of the character here mentioned, and we submit that the complainant should not, upon this hearing, have the benefit of any testimony derived upon this subject from such witnesses so produced in rebuttal.

In the consideration of this branch of this case, involving, as it does, a conflict of testimony, we call attention to the relative situation of the parties in the obtaining and submission of evidence.

The first witness produced on the hearing for the State of Kansas was M. M. Murdock, of Wichita, and the taking of evidence commenced at Wichita, where sixteen witnesses on the subject now under consideration were produced by the State of Kansas. Mr. Murdock is an editor. He established the "Wichita Eagle" in 1872, and has edited it ever since. (251.) He takes great credit to himself for the idea that the Arkansas valley was nourished by an underflow. He says that this became his "hobby," and that the Eagle was the first paper that advanced such a theory. (252.) It appears that the matter was given a political cast. Mr. Murdock was himself somewhat in politics. He has a son who was a member of congress, and at the time of the testimony was a candidate for re-election. One of the counsel for the State of Kansas was a member of the state senate in the legislature which provided for the bringing of this suit. Mr. Murdock had long been urging such suit. Mr. Murdock, after testifying, as we have heretofore quoted him, to the effect that the arable lands of his section of the state were increasing in value because of their wheat-producing qualities, and that as they increased in value they were taxed higher, then said:

> "As far as that is concerned, we have *not lost anything.* My contention—I said to those people who owned their lands, who bought their farms from the government, with the river there, and the supposition, of course, that it would always be there, 'You are going to lose your river and the value of your lands will deteriorate.' Now, that is the kind of argument I make. This suit was au-

thorized by the legislature, I think, by reason of the action of the people in Cowley, Sumner, Sedgwick and Reno counties acting in concert. We had to convince our own legislature that we were being damaged by the loss of water." (264.)

Now, the State of Kansas, in gathering up testimony to support its contentions in this cause, had the benefit of a sentiment, diligently worked up through newspapers, and by political effort, and supported by legislative action of the state, and had that aid and support which would naturally come from the interest of a citizen in the success of his own state in a controversy with a neighboring state. This sentiment is illustrated by the Kansas witness, George W. Watson, postmaster at Kinsley, who, on the witness stand, declares: "I am for Kansas." (2125.)

Upon the subject under consideration, however, the State of Colorado was necessarily dependent upon the evidence of citizens of Kansas. It came before those citizens as the adverse party in a suit, and from citizens of Kansas, having no interest whatever in favor of Colorado, but whose sentimental interest, at least, would naturally be adverse to Colorado, the defendant must obtain such facts as it can in support of what it believes to be the truth.

In view of the attitude of the witnesses in relation to the parties to this suit, the method of interrogating witnesses as produced by the State of Kansas is significant. The taking of testimony commenced in August, 1904, which was a time of high water, as it happened, and there had been high water continu-

ously from May of that year, and yet, constantly throughout the taking of testimony, counsel for Kansas asks the witness first to exclude the present period of high water, then to exclude all times of flood, and having made these exclusions, to give his view of the comparative flow of the Arkansas river in the last ten years, or seven years, as the case might be, as compared with an earlier period of years in the experience of the witness. This method of interrogation, under the circumstances, has a double vice. First, the witness is taking his most recent recollections of a period of drought, which are fresh in his mind, and is at liberty to compare that period with any indefinite period he may select of his own accord in the past for the purpose of comparison. Secondly, the witness must, in his own mind, determine how much he shall exclude, and how much include, before he gives an answer to the question, and as the result his evidence is merely the opinion of an interested witness, and would most naturally be given in aid of the contention he was brought to support.

When the cumulative testimony produced in rebuttal on the part of the complainant was being elicited, months had passed by. That rebuttal testimony commenced in May, 1905, and was completed in the middle of June, 1905, but in the meanwhile the Arkansas river had continued at high water, so that from May, 1904, to June, 1905, there had been a continuous flow in the Arkansas river, although the irrigation canals of Colorado were in full use. Now, in rebuttal testimony, when interrogating witnesses upon comparative flow of recent with earlier years, the witness is required to exclude the whole period of the current

high water, which had continued from ten to twelve months, and then make a comparison of the last previous period of years with other years of an earlier time, and give answer accordingly. The necessary and inevitable result would be that a witness whose sympathies were with the State of Kansas in the controversy would find ample opportunity to make a comparison favorable to the Kansas contention.

Now, at Wichita, as above suggested, the complainant originally produced sixteen witnesses, who testified upon this subject in favor of Kansas, under the conditions above suggested. When the defendant came to take testimony, it had no difficulty in finding twenty good citizens of Kansas at and in the vicinity of Wichita, who testified to exactly the contrary fact. Three or four quotations will illustrate.

J. M. Hall, of Wichita, says:

> "As to the flow of the Arkansas river near my land during the nine years from 1870 to 1879, as compared with the nine years last past, I would say my opinion is that we have had a stronger flow in the last nine years. By that I mean the river has not been dry so often in the last nine years as it was from 1870 to 1879. I am excluding floods in the river, yes, sir." (1703.)

John Williams, of Wichita, whom we have heretofore mentioned as being the owner of three thousand acres of land, with a frontage of five miles along the river, and who has lived in that vicinity thirty-two years, says:

"As to the average flow of the Arkansas river in the vicinity of my lands, compared for the last ten years with an equal period of time in the earlier years, I would say there hasn't been much difference to me. If there is a difference I haven't noticed it much. If anything we had more dry beds years ago than we have had the last ten years. Yes, sir, my judgment as to the flow is based upon my observations extending over this period of time. I have had chances to know something of that." (1707.)

On cross-examination he says:

"After the floods have passed I must say it is my true conviction that the low water is now about equal to what it used to be. I don't know where it comes from. It comes down the river, that is all I know." (1711.)

J. R. Sites, of Wichita, says:

"As to the continuous flow of water in the river during the time I lived there, as compared with the last eight years, I would say there has been a greater flow of water in the river during the last eight years than there was the eight years I lived there. Yes, sir, during the first eight years I lived there, there were times when there was no running water in the Arkansas river." (1712.)

J. W. Sites, of Wichita, says:

"I would say the average has been greater for the last ten years, and especially

for the last eight or nine years, than it ever was since I have been here." (1741.)

This witness has been on the Arkansas river since 1877.

At Arkansas City the complainant in its original case took the evidence of thirteen witnesses upon this subject, although largely in connection with the water power plant at that point. The defendant afterwards called fourteen witnesses at Winfield, the county seat of the county in which Arkansas City is situated, and whose testimony covers the same general locality, and the testimony of these fourteen witnesses completely refuted the testimony of the thirteen witnesss introduced in that county by the complainant.

E. W. Phillips, a farmer, who lives on the river, and has been observing it from week to week since 1870, except certain periods when he was in the legislature, says:

> "As to the flow of the water in the river for the last ten or twelve years, as compared with the flow of water in the river during the first ten or fifteen years that I knew it, I would say that I can't see any particular difference. It is about the same. There hasn't been enough change either one way or the other so as to make it materially noticeable. There have been extreme periods when it has been high and extreme periods when it has been low, but I haven't taken particular notice of it, of course, but as a general thing it is about the same." (1778.)

T. C. Price, of Winfield, says:

"As to the average flow of the Arkansas river for the last ten or twelve years as compared with a like period in the earlier years that I knew it, I would say, cutting out the year 1873, that was dry, and cutting out the year 1877, that was the flood, taking the year 1904 out, that was flood, and the fall of 1902, which was dry,—barring them, the fall and the summer, the dry years and the flood years, count them out, I think there is a little more water in the last ten years than in the first ten years; and if you leave those in I think it would average just as good or a little better in the last ten years." (1803.)

The fluctuations of the river, and the alternations of dry years and wet years, is illustrated by the testimony of William J. Spencer, that old man of the Soldiers' Home at Dodge City, heretofore quoted. He says:

"As to the flow of the river say from 1885 to 1890 as compared with those earlier years, I would say I didn't notice any difference; and taking the dry season in those earlier years, from 1865 to 1868 and along there and up to the present time in cycles of three to five years at a time, I will say I don't think there is much difference. As to the last three years and those very early years, I don't know. I never paid any attention to it. I don't know but what we are getting a little more water now. We may have less

after a while. In 1866 we had just about such a flow of water as we have here now. I don't think there was much difference in comparing the whole ten years just now past with the first ten years when I was on the river. We had a big flood in 1895." (1526.)

The quotations we have here made will serve to indicate the general character of testimony given by the sixty witnesses in behalf of the defendant's contention, that the flow of the river has not been materially different in recent years from what it was from ten to twenty years ago.

When, then, we consider the contradictory evidence of witnesses upon this subject of comparative flow, and consider it in connection with the great volume of testimony heretofore cited in reference to the known history of the river from the earliest days, and the scientific testimony in reference to the character of the river, we are bound to conclude that the character of the river as an intermittent or broken river has not changed in recent years.

4. The waters of the Arkansas run over a sieve in western Kansas.

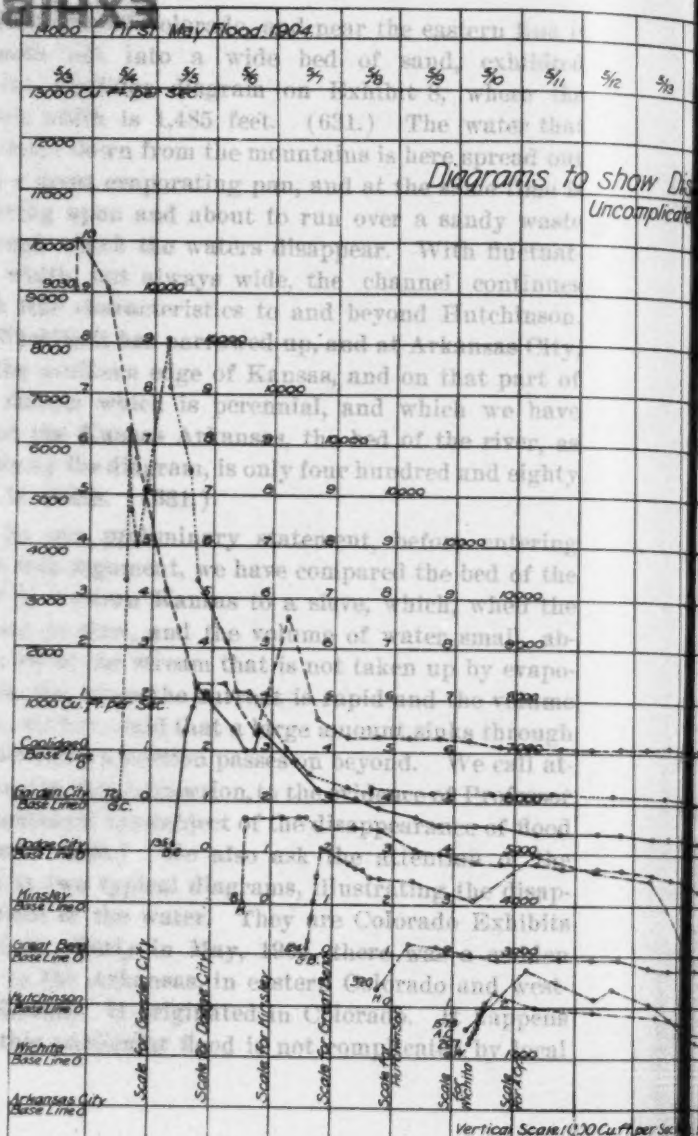
Professor Carpenter introduced in evidence and explained two diagrams, Colorado Exhibits 7 and 8, showing the width of the channel of the Arkansas river at various points from Canon City, in Colorado, to Arkansas City, on the southern edge of the State of Kansas. Reduced transcripts from those exhibits are here inserted. By examining Exhibit 7, we see the channel of the Arkansas, as it leaves the mountains, widening as it comes down towards the

eastern line of Colorado, and near the eastern line it spreads out into a wide bed of sand, exhibited in the Coolidge diagram on Exhibit 8, where the river's width is 1,485 feet. (631.) The water that has come down from the mountains is here spread out into a great evaporating pan, and at the same time is entering upon and about to run over a sandy waste through which the waters disappear. With fluctuating width, but always wide, the channel continues with like characteristics to and beyond Hutchinson. At Wichita it has narrowed up, and at Arkansas City, on the southern edge of Kansas, and on that part of the stream which is perennial, and which we have called the Kansas Arkansas, the bed of the river, as shown by the diagram, is only four hundred and eighty feet in width. (631.)

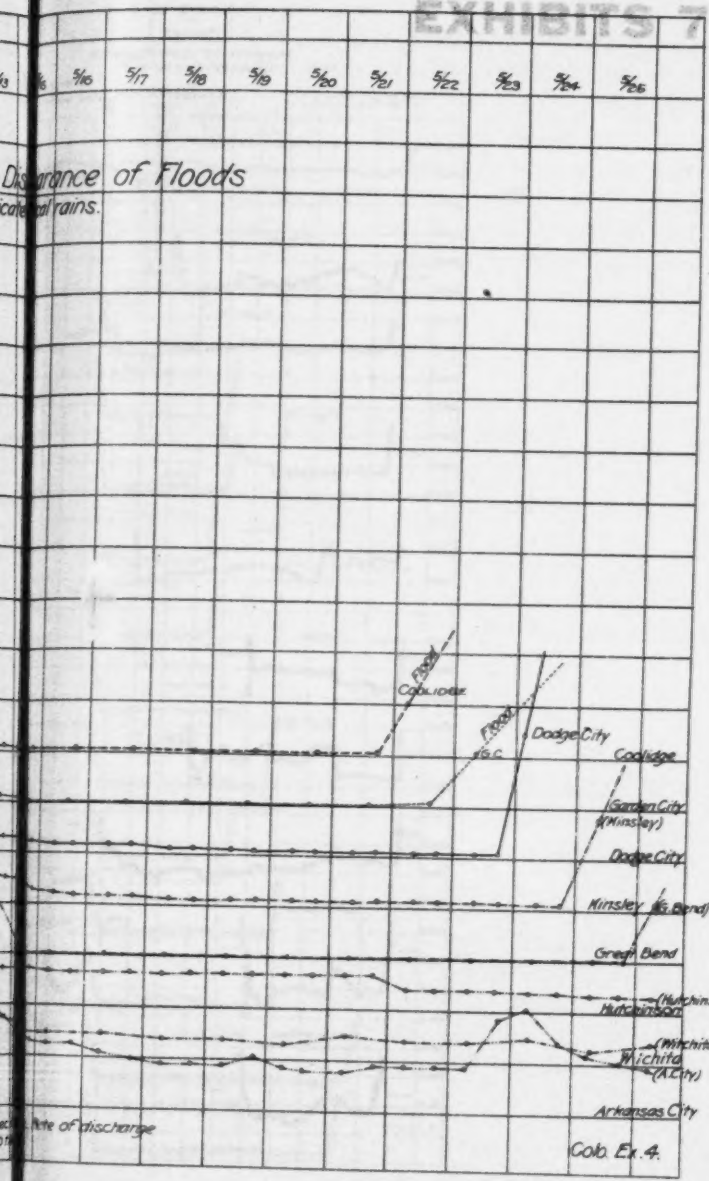
In our preliminary statement, before entering upon this argument, we have compared the bed of the river in western Kansas to a sieve, which, when the current is slow, and the volume of water small, absorbs all of the stream that is not taken up by evaporation, but when the current is rapid and the volume large, we have said that a large amount sinks through the sieve and a portion passes on beyond. We call attention, in this connection, to the evidence of Professor Carpenter on the subject of the disappearance of flood waters. (630.) We also ask the attention of the court to two typical diagrams, illustrating the disappearance of the water. They are Colorado Exhibits 4 and 6. Early in May, 1904, there was a sudden flood in the Arkansas, in eastern Colorado and western Kansas. It originated in Colorado. It happens that this particular flood is not complicated by local

EXHIBIT 4

EXHIBIT 4

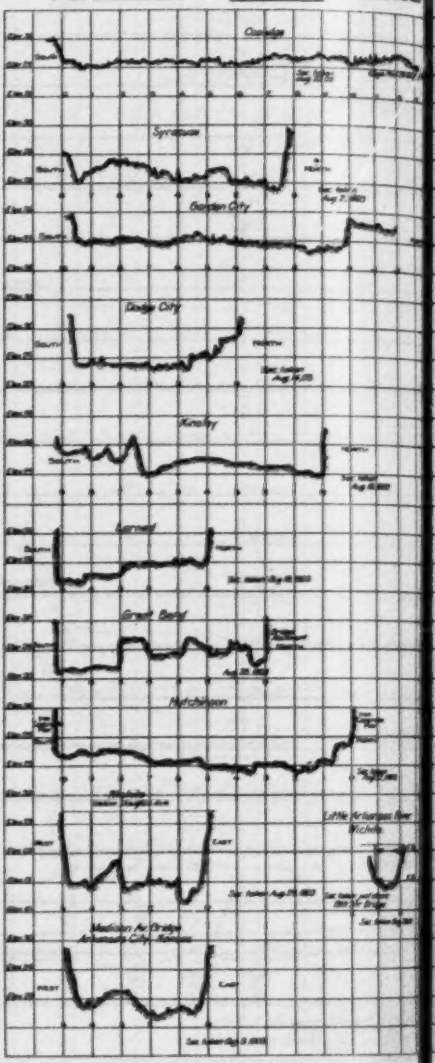

First May Flood, 1904.
Diagrams to show Dis
Uncomplicate
5/3
5/4
5/5
5/6
5/7
5/8
5/9
5/10
5/11
5/12
5/13
13000 Cu. Ft. per Sec.
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000 Cu. Ft. per Sec.
Coolidge Base Line
Garden City Base Line
Dodge City Base Line
Kinsley Base Line
Great Bend Base Line
Hutchinson Base Line
Wichita Base Line
Arkansas City Base Line
Scale for Garden City
Scale for Dodge City
Scale for Kinsley
Scale for Great Bend
Scale for Hutchinson
Scale for Wichita
Scale for Arkansas City
Vertical Scale 1,000 Cu. Ft. per Sec.
Horizontal Scale 24 Hours to 1

EXHIBITS 7 and



EXHIBITS 7 and

Widths and Cross Sections
of the
ARKANSAS RIVER
in
KANSAS.
Arranged in order from the Colorado
State Line down the River.
by
L.G. CARPENTER



Canon City Bridge
Pueblo Union Ave Bridge
Widths and Cross Sections
of the
ARKANSAS RIVER
in
COLORADO.
Arranged in order From Canon City to
Colorado State Line
By
L. G. CARPENTER
St Charles Bridge
Otero Dam
Manvel Bridge
Swink Bridge
Fort Lyons Dam
La Junta Bridge
Robinson Bridge
Cob Kansas Dam
Coolidge Dam
Lamar Bridge
Carlton Bridge
Cob Ex. 7

rains in Kansas, and it gives an opportunity for exact investigation. Observers took careful measurements at different points in western Kansas, and the diagram, Exhibit 4 (reduced copy of which is here inserted), shows the maximum flow of cubic feet per second of time at different points in the progress of that flood. From the diagram and from the evidence of Professor Carpenter (629) the following table may be made:

First May flood, May 3-10, 1904. (Colorado Exhibit 4.)

Cubic Feet Per Second.

Coolidge .....max. flow, 10,000, May 3rd, P. M.
Garden City..max. flow, 9,000, May 5th, A. M.
Dodge City...max. flow, 3,300, May 5th, P. M.
Kinsley .....max. flow, 1,800, May 6th, night.

Second June flood, 1904. (See *original* Colorado Exhibit 6.)

Cubic Feet Per Second.

Coolidge .....max. flow, 39,181, June 22nd, 1:00 P. M.
Garden City..max. flow, 15,800, June 22nd, P. M.
Dodge City...max. flow, 9,100, June 23rd, A. M.
Kinsley .....max. flow, 8,100, June 23rd, evening.

It will be observed that in going down the stream the May flood, above mentioned, lost eighty-two per cent. of its water between Coolidge and Kinsley. In the June flood, above mentioned, it will be observed that the river lost more than seventy-five per cent. of its water between Coolidge and Kinsley. What be-

came of that water in these instances of flood? There are only two possible methods of disappearance. One, evaporation, the other, sinking in the sands. Both causes manifestly operated, and both causes were entirely natural causes, unconnected with any act of man, and they give emphatic illustration of the character of this river as shown by the long line of historical references and evidence which we have heretofore given.

In connection with this subject we would say that the complainant introduced in evidence its Exhibit No. 5, which is a record of mean monthly discharge of the Arkansas river furnished by the United States Geological Survey from the earliest record down to and including 1903. (334.) The United States, as intervenor, also put in evidence its Exhibits Nos. 17 and 18, giving the record of rainfall at Dodge City and Wichita respectively. (2286.) From these exhibits we find the following facts as to the month of June, 1903: The month of June was, as to rainfall, a dry month, but followed a good rainfall through the month of May. At Wichita, especially, the May rainfall in 1903 was about eight inches, while the average rainfall for that month through a series of years is only five inches. Moreover, this rainfall was in a wet year, and the preceding year, 1902, had in the vicinity of Wichita been marked by abundant rainfall, having during the year an excess of nine inches above the normal for that locality. In the month of June, 1903, however, the rainfall was very light at Wichita, being only one and one-quarter inches, and at Dodge City the rainfall in June, 1903, was only one and one-half inches, about half what it had been during the preceding month.

Now, if we look at complainant's Exhibit 5, for the month of June, 1903, we shall find the mean monthly discharge of the Arkansas river for that month at different points as follows:

Rocky Ford	3,436 second feet.
Lamar	4,296 second feet.
Coolidge	6,608 second feet.
Hutchinson	3,016 second feet.
Arkansas City	5,598 second feet.

This was manifestly a period of what might be called high water, but it does not represent any particular flood. It is a mean for the entire month of June, and certain significant facts appear. First, that at Coolidge, on the extreme west of Kansas and at the western end of our "sieve," the monthly discharge for that month was 6,608 second feet; that at Hutchinson, beyond the eastern end of the "sieve," the discharge was only 3,016 second feet, while at Arkansas City, well down on what we have called the Kansas Arkansas, it was substantially 5,600 feet.

Now, this particular situation has been but slightly, if at all, affected by local rainfall. The ground itself, especially from Dodge City to Wichita, has been thoroughly saturated by previous long continued wet weather, and yet, under conditions such as these, in going over the "sieve" from Coolidge to Hutchinson, the Arkansas river loses more than 54 per cent. of its volume of water, and this, as shown on a monthly average prepared by the United States government. This series of government figures has further significance, in view of the argument to be hereafter presented, in the circumstance that in the territory through which the Colorado canals are tak-

ing out an immense volume of water, we have, nevertheless, this fact, that at Lamar, Colorado, which is a number of miles below Rocky Ford, the flow was, in that month of June, 30 per cent. greater than it was at Rocky Ford, and at Coolidge, Kansas, a number of miles below Lamar, and below all the Colorado ditches, the volume of water was more than 50 per cent. in excess of that at Lamar. Comment will be made upon these circumstances in connection with another subject. (*Infra,* pages 134-140.)

It is a river of this character, intermittent in its flow; at times in each year (irregularly as to periods of the year) being a dry sand bed through western Kansas, a stretch of channel where, even in times of flood, more than three-fourths of the water will absolutely disappear; it is such a river concerning which we are to prosecute our further inquiries as to the effects of the diversion of the waters of the Colorado Arkansas.

III.

THE DIVERSION AND USE OF THE WATERS OF THE COLORADO ARKANSAS HAVE NOT DIMINISHED THE "LOW WATER" FLOW OF THE RIVER IN KANSAS.

It would seem to be apparent from the facts presented and discussed in the last division of this argument that the proposition here stated is true, because of the very character of the river itself. If the perennial stream which we have called the Colorado Arkansas does normally at low water stages sink into the sands and disappear near the state line between Kansas and Colorado, leaving a stretch of practically

bare sand for many miles east thereof, then the fact that the waters of the perennial stream in Colorado are captured before they are permitted to sink into the sands, and are utilized upon the lands in Colorado, does not have the effect to diminish any low water flow in Kansas, because in the normal condition of things at low water the stream would have sunk into the sands instead of flowing upon the surface through western Kansas. (Newell, 1266.)

In the presentation of the case for Kansas much emphasis is put upon the amount of water covered by decreed appropriations along the Arkansas river in Colorado, and upon the size and extent of the canals which take the water from the streams. It is, of course, absolutely immaterial, for the purposes of this case, that the registered appropriations claimed by individuals and corporations exceed the possible capacity of the river. Certainly we can not take from the river more water than it carries, and even if we divert all the water which the Colorado Arkansas bears down to the sands of Kansas, the most that can be said is that we change the method of its disappearance, and that instead of having it lost to the use of man by sinking in the Kansas sands, it is applied to beneficial uses in the State of Colorado.

But in considering this subject we shall not rely alone upon the proved character of the stream, as hereinbefore set out, but it will become further apparent from the testimony, and by the application of sound reasoning to established facts, that the practice of irrigation in Colorado has not diminished the low water flow of the Arkansas river in Kansas.

1. The use of water from the river in Colorado is confined to an economical use of such water within the limits of the Arkansas valley.

There is not a suggestion in this record that any of the defendants, or other parties, have ever taken any of the water of the Arkansas river out of the valley of that river. All of the waters diverted from the Arkansas are used in the valley of that stream. (Carpenter, 668; Bent, 975; Chev, 491.)

As irrigators have become familiar with the process of using water, they have learned to prevent waste and are applying the water to the land by economical methods.

Mr. Elwood Mead, chief of irrigation and drainage investigations in the United States department of agriculture, says that taking everything into consideration, the system that has been developed by Colorado for the distribution of the waters of the Arkansas river is among the best to be found in the United States. (1376.) He also expresses the opinion that the water administration along the Arkansas in Colorado is entirely efficient, at the same time expressing the belief that a higher duty for water will be obtained by better methods on the part of *farmers*. (1378.)

We shall, further on in this argument, discuss the detention and storage of flood waters.

2. Continued irrigation has the effect to create or increase the underground saturation in the territory irrigated, and the seepage waters from the canals and from the irrigated lands return in favorable and continuous distribution to the channel of the stream.

We readily admit that the primary and immediate effect of the diversion of the waters of the ordinary

stream for purposes of irrigation, at the beginning of the process, is that it diminishes the contemporaneous flow in the stream for some distance below the point of diversion, and such diminution may substantially equal the amount of the diversion. But continued diversion of the waters of a stream flowing through the arid country soon produces a different result.

In the process of time the water seeping from the canals or ditches will saturate the soil and underlying material from the line of the canal to the channel of the stream, and, the supply continuing, this will have the effect of giving a permanent body of ground water, which forms springs, converts dry arroyos into running creeks or rivulets, and, even though the original stream had been wholly diverted at the head of the canal, a large flow of water will be found some distance below again occupying the channel of the original stream, constituting what may be called return waters.

We call attention to the testimony of scientific men, whose evidence appears in the record, and of experienced irrigators, who have testified in this case. In the record appear certain quotations from a report made by Major J. W. Powell, chief of the Geological Survey, to the secretary of the interior, for transmission to congress. Major Powell develops the subject very fully in his report, and says:

> "But experience in California, in Utah, in Colorado, and on the Gila in Arizona, abundantly exhibits the fact that the waters used in irrigation are but partially evaporated, and that a very large quantity finds its

way again to the streams. It is thus that the facts of experience have modified preconceived hypotheses." (664.)

Professor Carpenter, as a result of his investigations, states that throughout an irrigated region a stream may be drained dry, and within a short distance it will again be a flowing stream, of, perhaps, considerable magnitude. (669.)

He says that since irrigation has been practiced between Canon City and the Kansas-Colorado state line, it is found that the aggregate or sum total taken out by the various ditches along the river will be greater than the amount found at any given place. That use in the aggregate, therefore, is more than appears to be in the stream or that passes Canon City, and that is true because a great deal of the same water is used over and over again. (670.)

We ask the attention of the court to the testimony of Mr. T. C. Henry (712, 721, 724); Henry McAllister (825); Thomas Shidelar (837); Dall De Weese (839), and John Ross (850).

George W. Swink, of Rocky Ford, heretofore quoted on other points, is an experienced irrigator. He gives a number of practical illustrations, which illustrate the return of waters to the stream, at pages 914 and 915 of the record. He has lately become interested in ditches in western Kansas, and he says:

"For the last two years there was no time but what we could have drawn from the river quite a little water, but not enough to irrigate any great amount. Probably at the

lowest time, five or six feet would be drawn. I figure that will increase as the country is more irrigated above there; that there will be still more of a continuous return to the river that will help it out, and then when high water comes we will have a good supply."

He further says:

"The people in western Kansas rely on irrigation for the raising of crops. If water were prevented from being used from the river in eastern Colorado or western Kansas, it would, in my judgment, be a great injury to the people in both places." (915.)

We respectfully refer the court also to the testimony of Frank Kreybill (928); C. P. Thoman (940).

The last witness mentioned says:

"The increase in the flow of the river from seepage extends down to Coolidge and beyond that some distance, but it sinks there. It always has done so." (943.)

Harry S. Crittenden lives at the state line, and says that he thinks the seepage increases the flow of the river at that point, and he finds that the flow gets heavier in months that are said to be dry months.

"Our flow gets heavier in September and heavier later on. This year it was the heaviest in October." (949.)

See, also, the testimony of Amos Newton Parish (966, 968).

The intervenor examined many witnesses as to streams other than the Arkansas through the arid regions of the United States, and in the evidence of such witnesses we find the following:

Mr. Van Orsdel, attorney-general of the state of Wyoming, who, however, is familiar with streams and irrigation therefrom in his state, in speaking of the North Platte and the South Platte, says:

> "I own property below the junction of the two rivers. I do not think the flow of the river below the junction has been materially affected during the last fifteen years by the taking of water out of the North Platte in Wyoming and the South Platte in Colorado. I mean the average flow." (1056.)

He says that if the water were appropriated in the State of Colorado and used upon the water shed of the Platte river, there would be quite a material return to the stream in the way of seepage, and that the return of these waters would have the effect, to some extent, of sustaining the uniformity of the flow below during the dry season. (1058.)

We call the especial attention of the court to the testimony of William G. Hamilton, of Roswell, New Mexico, who shows a very careful study of the action of waters diverted for purposes of irrigation. (1125.)

Mr. J. J. Hagerman, of Roswell, New Mexico, says:

> "If this water was taken out during high water and spread upon the lands adjacent to the Arkansas river for a distance of ten or fifteen miles back from the river, that would result in a large amount of seepage water returning to the river. If you took it out in time of high water and took it back from the banks of the stream a considerable distance, of course a great deal of that water would be left in the land after the flood had ceased and would gradually find its way back to the river in the dry time. To that extent it would be a help to the stream below, and to that extent it would act similarly to a reservoir and would act to that extent very much as the forests on the mountains act, as a sponge to hold back the rainfall and let it come down gradually in dry times. Of course, how much that would help would depend very largely on how far you took it back from the river. If you used it right on the edge of the river or very near the edge of the river, it would soon drain out; but if you took it back a considerable distance the farther back you took it, the longer it would take to get to the river. The better regulated it would be in proportion to the distance you took it back." (1154.)

Mr. W. A. Reeder, of Phillips county, Kansas, is a member of congress, but he has given a good deal

of study to the subject of practical irrigation in his part of Kansas. He gives some very interesting testimony upon this subject, beginning at page 1214 of the record.

The record contains abundant evidence of like character to that which we have cited. (See, also, *supra*, pages 131, 132.) There is, however, no attempt on the part of the complainant to contradict the general proposition we are discussing in this section, and we pass to another feature of the general subject.

3. After an irrigating system has been some time in operation, the resulting effect is to equalize the flow of waters in the channel of the stream below the area of irrigation, and this has been the effect in the Arkansas valley.

The general principle which we have here announced is set forth in terms by Professor Elwood Mead. He says:

> "Now I will say that this increase in return seepage is a universal action; it is a change that takes place in the flow of every stream that is diverted for irrigation. The tendency of irrigation is to act as an equalizer. The excessive diversions are always made when there is an excessive flow in the stream and the water fills up the soil during that time, * * * then finds its way slowly back to the stream; that is, irrigation tends to diminish the flood flow of the river by diversion at that time and tends to augment the low water flow, or at least the late

flow of the river, by the return of waste and seepage water." (1382.)

Speaking on a similar subject, Professor Mead says:

> "I will say this, that in all my experience the irrigators living on the lower part of the stream desire the fullest diversion during the periods of abundance, because when you divert and apply an excessive quantity of water you not only increase the total quantity which comes back as seepage,—and that usually comes back when you need it the greatest,—but you increase the percentage of return seepage; and so in irrigated districts everywhere the irrigators who live on the lower part of the stream welcome and encourage excessive diversions above when there is an abundance in the river." (1393, 1394.)

This effect of equalization is explained and elucidated by Professor Carpenter (672, 675).

Mr. Reeder, above referred to, says:

> "It is a fact that if the water is put on the soil and sinks in, its progress in returning through the soil is much slower than its flow over the surface, and there is no question but that taking the water out during the flush flow of the creek causes it to return to the stream at a time when the normal flow would be low, and thereby it equalizes and

> maintains the flow of the stream. I don't think there is any question about that. By taking the water out when the stream is flush you reduce the maximum flow, and later on increase what would be the natural minimum." (1220.)

Professor Newell says that the withdrawal of the water for irrigation, and its application to the soil at a time when the stream is high, has a tendency to maintain the flow of the stream lower down later in the season, and thus equalizes the flow of the stream. (1281.)

Mr. W. M. Wiley, an experienced irrigator, and representative of one of the defendants in this action, says:

> "The waters taken out of the river by irrigation in flood times and winter time are, with the rainfall, stored in the land, and this, added to the rainfall, increases the constant and steady percolation of the water back to the river and helps to make it a constantly flowing stream, whereas before it was a dry sand bed." (1437.)

Now, this evidence as to what is and must be, as set forth by those who have scientific knowledge, appears to be an observed fact, as shown by citizens of Kansas living along the river.

Harry S. Crittenden, who lives in the vicinity of the state line, says that in the last three years the flow is more regular, and he is speaking particularly of the intake of the Frontier ditch, a Kansas enter-

prise, and says that he attributes the flow there to seepage from irrigated districts up the valley. (948.)

John D. Sidlow says that the low water flow continues more regularly, or keeps up some flow more permanently in later years than it did in the earlier ones. (1515.)

He says that there is a more constant flow of water through the season, in the dry season, a more constant flow during August, September, October and November during the ten years prior to 1904 than there had been during the same months in earlier years. (1516.)

H. Juneau says that he thinks the flow is now more even, if anything, than what it was in the earlier years (1536), and although a Kansas farmer, living at Dodge City, he says:

> "If you take the water for irrigation in Colorado, all of the Arkansas river except at extreme flood times, it would equalize the underflow here through the valley. Yes, if they used all of the water in the river up there that they can possibly use, it would seep down into the river and cause a more even stream here." (1545.)

John F. Lewis, of Great Bend, says that the average surface flow of the river during the last six or seven years, compared with a like period of time in his earlier acquaintance with the river, has been much more uniform since 1897 than it was previous to that time. (1603.)

Reason, science and experience all unite in supporting the proposition that, under the conditions now

affecting the Arkansas river, the diversion of the waters of that stream for irrigation in Colorado, under the methods there pursued, has the effect of diminishing floods and increasing the low water flow of the Arkansas river in western Kansas.

4. Irrigation on a large scale in Colorado has had the effect of gradually extending eastward what might be called the perennial flow of the Arkansas river, the *Colorado* Arkansas.

The evidence of the old timers, set forth so fully in Division II of this argument, shows us that in the early days the perennial Colorado Arkansas terminated a considerable distance west of the state line. It seems now to extend, at least, to Coolidge, and probably to Garden City, in Kansas, and one of the very largest canals involved in this controversy, to wit, the Amity canal, now extends across the state line, having eighty miles in Colorado and thirty miles in Kansas. (1432.) And the increase of seepage water from the Amity canal has become so great that Kansas ditches have been revived and put in order, and utilize the now perennial flow east of the state line. This is a natural and even necessary effect of long continued irrigation on a large scale. Waters which were wont, in the natural state of the river, to sink into the sands and entirely disappear, have been captured before reaching the point of such disappearance; have been lifted, as it were, to a higher level, and carried out upon land which will not permit so rapid absorption of the water as had taken place formerly in the sands of the channel. At this higher level the waters are carried for long distances, the Amity canal itself be-

ing 110 miles long, and are thus carried in a more impervious channel than that in which they had been accustomed to flow, and go to a much farther distance before they are lost in the underlying soil or sand. In the meanwhile, for the whole distance to which such waters are thus carried at a higher level, they gradually create underground waters, saturating the soil as above suggested between the line of the canal and the line of the old channel. The seepage water comes back into the channel of the stream at a point far east of the initial point of former disappearance, so that, in the channel itself, the process just described has given a supply of water where, under the old conditions, there would be none. And even if, after again reaching the channel, they have also reached the *sieve*, which we have heretofore described, yet they reach that sieve farther east, and opportunity is given for the capture of such waters before they are again lost in the sands.

The evidence in this record clearly supports the proposition we are here presenting. When Professor Elwood Mead was upon the stand, as a witness for the United States, intervenor, he was vigorously cross-examined by counsel for the State of Kansas, and the following questions and answers appear in the printed abstract of record:

> "Q. Then is not this the net result of it all, that the return seepage from the ditches between Pueblo and the Kansas-Colorado state line goes to increase the amount of water that each successive ditch can take rather than to increase the amount of the

water flowing in the river east of the Kansas-Colorado state line? A. Well, it is like this—that they successively increase, as you go down, the quantity of water in the river. If you take the Amity as the last ditch there, for example, supposing that it takes all the water out of the stream, seepage and everything else, then the quantity that came to Kansas would be the accumulation of seepage water from that canal.

"Q. Yes, and that would be all the seepage water that would pass into the State of Kansas, would it not? A. Yes. But if you increase that sufficiently you will get as much water from seepage from the Amity canal as you would get from the natural flow of the stream without any of these diversions.

"Q. Then if there is another ditch down below the Amity that takes all that the Amity does not take, and the seepage from the Amity, you would just have a recurrence of that, increasing the amount of water that each ditch gets, but it does not increase the flow in the state below? A. Well, it would just *continue to travel on down.* Of course the same action that increased the flow of the Fort Lyon and the Amity would in time travel on down, increasing the flow of the Kansas ditches. *The same action that would increase the Amity's water supply would increase that of the ditches down in Kansas.*" (1391, 1392.)

Professor Carpenter says:

> "As the land is irrigated from year to year it requires less water; that is, land usually requires more water when first brought under irrigation than after it has been irrigated for a series of years. My observation and experience have shown that where large tracts of land bordering on a stream have been brought under irrigation, the seepage or return waters from such irrigated lands tend to increase as the years of irrigation increase." (672.)

S. W. Cressy, of Rocky Ford, is one of the Colorado water commissioners, and, though he supposes that the Amity canal does not itself at present irrigate any lands in the state of Kansas, he says that the seepage waters from the Amity canal would find their way back in the neighborhood of twenty miles east of the state line, or until you reach the first natural water shed or arroyo leading in from the north. (897, 898.)

Mr. Cressy also says that if there is a large amount of water running in the river in Kansas at the time of his testimony, or during the few months preceding, that it certainly comes from seepage or out of some side stream below the headgate of the Fort Lyon canal. (925.)

Amos M. Parish tells of specific streams along about the state line which are now running continually, but which used to be dry, and which are given vitality by seepage water. (964.)

Mr. W. A. Reeder, heretofore quoted, speaking from his experience in matters of like character, says:

> "If the evidence shows that all of the seepage water in Colorado comes back into the river above the mouth of ditches below and then is taken and successively taken, as to how any of that will get down in Kansas, I will say that every time the water becomes seepage and is carried out into another ditch, that seepage is carried still farther down the river and extends the seepage towards the east that far. That is why I think it is advisable to take every stream out, barring prior rights of course, as near the source as possible, because it must carry seepage that finally makes the river stronger and when you use the water once that is all you can do with it until it soaks back. If you use it near the source you can use it again, and it seems to me it will finally give the very best possible use of the water and the best possible stream." (1218.)

Mr. William G. Hamilton, of Roswell, New Mexico, whom we have cited, speaking of the San Luis valley, says:

> "In some cases it takes years, and did in that valley, for the waters to find a channel to the river; and aside from all possibilities based upon hypothetical conditions, which I say do not exist, it is my observation that during the period of low water in the river the flow of the stream at the canon where it

leaves the San Luis valley is better maintained and carries more water than before irrigation was commenced in the valley. It carries a great deal more water." (1131.)

In the cross-examination of witnesses upon this subject, counsel for the State of Kansas made a sort of mathematical argument, somewhat in this fashion: Well, here are a succession of canals; the first takes out the whole river; two-thirds of the amount will be consumed in plant life, or be evaporated, and one-third only returns to the river channel as seepage; the next ditch down the stream takes out all of the river, which would mean all of this seepage, which is only one-third of the contents of the river above the first headgate; of the amount taken out by ditch No. 2, two-thirds is used up by evaporation or plant life, and one-third only goes back to the river. We now have only one-ninth, instead of one-third, of the amount above the first headgate, and so on to the next, when there would be only one twenty-seventh left, and we very soon, with the succession of ditches, have the amount of return seepage almost infinitesimal. This mathematical argument entirely ignores the element of time which has been dwelt upon in much of this testimony on the subject of return waters. The only period during which the question of an increased supply of water in the stream is material is the period of low water, constituting but a portion of the year. The canals in Colorado, however, are carrying water all the year, in flood time, in time of high water, as well as in time of normal flow. To a large extent the flood waters are stored. (Wiley, 1430, 1437, 1439, 1443.) The water run-

ning in the canals through the non-irrigating season, and especially in times of flood and high water, finds a reservoir in the soil itself, and it is the accumulation, resulting from continued flow in the canals and the storage in reservoirs through the whole year, and a succession of years, that gives the supply of seepage water which becomes of practical benefit in time of low water or drought, and this explains why it is that in some of this evidence, as, for instance, in illustrations given by Mr. Hamilton, there is a larger flow of water at some distance below headgates than there was at the headgate itself, although the entire stream at such headgate was diverted.

An interesting illustration of this increase of flow, as the result of irrigation, is given by Mr. F. W. Swanson, a water commissioner for District No. 20, in Colorado, covering the Rio Grande river and its tributaries. He says that in performing his duties as water commissioner he has had occasion to notice the return waters from irrigation, and he says:

> "I know at the Government measuring station above Del Norte there was less than one hundred cubic feet of water running through per second of time. At the same time, below Del Norte, down the river, clear down below Alamosa, I was distributing over three hundred feet of water into the different headgates. * * * There were no tributaries of the Rio Grande between that measuring station and the lowest point at which I distributed the water as above stated. There

were no tributaries that were running water at that time. There were no rains along the river to augment the supply." (804.)

The facts so clearly stated by Mr. Swanson give the strongest confirmation of our argument as here presented.

5. The argument of the Kansas brief on the causes of the alleged decrease of flow.

As heretofore suggested, the complainant's counsel in their brief fix the year 1890 as the year in which the effects of irrigation in Colorado were first manifested in Kansas. Such alleged effects certainly could not be attributed to any earlier date. On page 47 of their brief they say:

> "Between the years 1888 and 1893, the waters of the Arkansas river were diverted for irrigation purposes in Colorado, and the flow of the river through Kansas was greatly diminished, and for many months in the year it practically ceased. After about 1890 the amount of water coming down the river during the June rise was appreciably less, or the June rise did not come at all." (Pl. Br., 47.)

Now the school boy is taught that there is a fallacy lurking in the expression *post hoc, ergo propter hoc,* but if so what shall we say of the logic which rests upon the proposition *ante hoc, ergo propter hoc?*

The first witness cited in the brief in support of the complainant's proposition, to wit, Mr. Caldwell,

speaking of the diminution of the river, as quoted by the complainant, says:

> "This diminution, I should say, was noticed first in *1885*. It was noticed in 1886, 1887, 1888, 1889 and in there. It has been nearly stationary for the last few years. For the last seven or eight years there hasn't been much change." (356; Pl. Br., 34.)

The next witness cited by the complainant, to wit, Mr. Mathewson, is the one who glories in the name of "Buffalo Bill." He says:

> "I was the only man that was ever known on the plains by that name. There have been others written up in dime novels, but they never were on the plains." (2152.)

Now, Mr. Buffalo Bill Mathewson, as quoted by complainant's brief, fixes the termination of the good flow and the beginning of the bad flow in the '80s.

> "Probably 1885 or 1886, or somewhere along there. I wouldn't say particularly what year, but it was along about that time. And there was not nearly as much water in the river, and the islands—the tow heads—commenced building up all along the river." (Pl. Br., 34.)

Kansas also cites Mr. Harrison, of Colwich, but the short passage quoted contains this sentence:

> "The average flow of the Arkansas river during the dry season of the year has de-

creased since the year *1885* to the extent of two to five feet." (Pl. Br., 39.)

Counsel also cite Mr. Longstreth, of Lakin, and find it necessary to quote this passage:

> "I didn't notice any falling off in the supply of water there for some time afterwards [that is, after 1880], down to about *1886* or *1887*, I think, somewhere along there." (Pl. Br., 44.)

Counsel for complainant in their brief further say:

> "This decrease in the flow of the river between the years 1888 and 1893 became so marked, so noticeable, that as a matter of common, scientific and historical information, Mr. J. R. Mead in the year 1893 presented a paper before the Academy of Science, at Topeka, Kansas, entitled 'A Dying River,' which article is published in the record of its proceedings for that year."

Now, Mr. J. R. Mead was introduced as a witness by the complainant, and tells about the "Dying River," and how he came to write it. It will be observed that the paper was written in 1893, only three years after the first date to which the complainant ascribes any injurious effects from the diversion of waters in Colorado. Mr. Mead says:

> "As to what facts caused me to write that article, I will say, first, it is a scientific fact of general interest; next, it is a very

marked or unusual phenomenon; and, third, I had *for many years* anticipated very disastrous results in this valley in which I was largely interested." (2138.)

Mr. Mead, therefore, had been anticipating, for many years before 1893, the very results about which he was then writing. Many years would certainly carry it far back of the time when the irrigation complained of commenced in Colorado. But we are not left to uncertainty upon the subject. Mr. Mead further says:

"As to changes that I have noticed along the Arkansas river in later years, I will say, the river has been exceedingly erratic in its character since *1880*. From about 1880 there was a great decline in the volume of water in the river, and in the *last several years* there apparently has been during the summer an *unusual increase* in the volume of water." (2133.)

On cross-examination he further says:

"I think it was noticeable that there was a difference in the river before 1880, but not a very noticeable or pronounced difference, and by the year 1880 it was sufficient so that it was observed and spoken of frequently and generally among the people that were here in the early days." (2142.)

We have, therefore, from the complainant's counsel, this remarkable argument: Commencing with

1880 there was a great decline in the volume of water in the river; in 1890 Colorado began to divert the waters of the Colorado Arkansas, and used them for the purposes of irrigation in Colorado; in the last several years there apparently has been during the summer an unusual increase in the volume of water—*therefore,* the diversion of waters in Colorado subsequent to 1890 caused the depreciation in the flow of the Arkansas at Wichita in 1880. Such, at least, is the form into which the facts cited mould the argument.

But, in further argument upon this subject, counsel for Kansas introduce certain photographs of the river at Wichita. Exhibit No. 1, taken in the summer of 1878, shows a good flow of water under the old bridge at Wichita. Exhibit No. 2, purporting to represent conditions from 1878 to 1889, again shows a large flow under the new Wichita bridge, but with an island below the bridge. Exhibit No. 41 is a photograph, showing Wichita bridge, September 16th, 1904, and counsel say in their brief as to this photograph:

> "The level of the water is two feet below the stone abutments, the wooden piles protruding twelve inches above the water, and the grillage work occupying twelve inches." (Pl. Br., 52.)

Now, in view of the acknowledged character of the Arkansas river, it is unnecessary at this time to more than suggest that with the river sometimes at high flood, a deep, broad, strong stream, at other times a bare bed of sand, with trickling rivulets or little pools of water, any kind of photograph can be ob-

tained that the photographer desires. Taken at one time it shows the dry bed of sand. Taken a week later it may show a raging flood, and this fact is illustrated by another photograph inserted in the complainant's brief, Exhibit No. 60, being a flood view on May 16th, 1905, eighteen miles above Wichita. Here we have a great broad, flowing river. A practically normal representation of the perennial Arkansas at Arkansas City is shown on the defendants' Exhibit No. 1, here inserted, illustrating the conditions at that point on July 18th, 1903.

In reference to complainant's Exhibit No. 41, about which it produces a great deal of testimony, and upon which it evidently greatly relies, we call attention to the fact that throughout the testimony in this case from witnesses, both for the complainant and defendant, the fact is elicited that the channel of the Arkansas is constantly shifting; sometimes it is in the middle, sometimes on one side, sometimes on the other; and artificial filling along the banks (a subject for further consideration in this argument) has at places narrowed the river and *deepened the channel.*

In addition to these well established facts, we find that, prior to the taking of this photograph, designated as Exhibit No. 41, the bed had been lowered in the vicinity of this bridge by the pumping out of sand. The witness Tucker (1681) says:

> "Yes, sir, they have been pumping sand out of that channel near the bridge there; within half a mile of the bridge there have been four sand pumps running a considerable time—there was for a good while four,

THE ARKANSAS RIVER AT ARKANSAS CITY

part of the time. One of them has been running four or five years. When those sand pumps are running they take sand out of the bed of the stream, yes, sir. It comes out on the bank. A great deal of it is hauled away and used and a great deal of it is still there. By that process the channel of the river would be made a great deal deeper where they are pumping. They pump it as deep as ten or twelve feet." (1681.)

He further says that they pump sand within fifteen feet of the Douglas avenue bridge. (1682.)

Another witness speaks of dredges operating to take out sand from the vicinity of this bridge. Under such conditions the aspect presented by Exhibit No. 41, with the wooden piles protruding, needs no further explanation, and yet, the fact is apparent that this deepening of the channel by dredging and pumping out the sand from its bed would, under various natural conditions, cause a further scouring by the action of flood waters.

Counsel for complainant also dwelt at considerable length in the taking of testimony upon the fact that in 1872 cattle swam across the river at Wichita, and on page 46 of their brief they refer to their Exhibit No. 52 as a fair representation of a herd of cattle swimming the river at that time. This was a photograph from a drawing, and not from nature, and it is not reproduced among the numerous photographs set forth in the brief, perhaps by reason of the severe criticisms which the complainant's witness, Mr. Mead, has made upon it. (2139.) But be that as it may, the fact is that there are times in the present passing

years when, in the absence of a bridge, cattle could not cross the river without swimming, and at the very time when the testimony for the defendant was being taken at Wichita, in May, 1905, the river was at such a stage, so that the witness L. B. Dotson, of Wichita, says:

> "As to how I would bring cattle across *at this time* from the west side of the river to the east, at any time within the last two or three weeks, I would say, if we didn't have the Douglas avenue bridge, we would have to swim them, I suppose. Yes, sir, I think I would swim them just the same to-day, and for the last two or three weeks, as in those early days when I formerly swam them. I should think so from the looks of the river." (1755.)

The same fact is stated by one of the complainant's witnesses, referring to June, 1905 (McCoy, 2184).

It would seem unnecessary to pursue this subject further, and we respectfully submit that in the light of the evidence, and of this discussion, our proposition standing at the head of this division of our argument is well established, and that the diversion and use of the waters of the Colorado Arkansas have not diminished the low water flow of the river in Kansas.

IV.

THE DIVERSION AND USE OF THE WATERS OF THE COLORADO ARKANSAS HAVE NOT DIMINISHED THE SO-CALLED "UNDERFLOW" IN THE ARKANSAS VALLEY IN KANSAS.

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1. Preliminary Discussion.

It is a universal fact that water is found beneath the surface of the ground at a greater or less depth. In humid countries this underground water can be readily reached by wells, and especially so in the valleys of streams. It is almost universal, if not absolutely so, that in the valleys of streams this ground water will be found at an horizon not lower than the level of the water in the adjacent stream. It usually is higher. In the Arkansas valley in Kansas the banks of the stream are low, as shown by many witnesses. The surface of the bottom lands along the banks of the river are oftentimes not more than three or four feet above the bed of the stream. In such a valley, the ground water would, of course, be reached by wells of very shallow depth. This underground water has received various names, as the "water table of the country," "ground water," "sheet water," and "underflow." The complainant uses the latter term in speaking of the underground water in the Arkansas valley, and for convenience of discussion we shall use the same term, not intending thereby in the slightest degree to concede that its origin or character is as claimed by the complainant.

The complainant claims that in the Arkansas valley this underflow is a part of the Arkansas river, and that it extends the width of the valley, and that it moves with a current as the river moves. It further claims that the diversion of waters for irrigation purposes in Colorado is the proximate and immediate cause of a lowering of the general level of this underflow to the serious detriment of the lands in the valley of the Arkansas in Kansas.

These contentions of the complainant would seem to be fully met by the argument already presented. In view of the character of the Arkansas as an intermittent stream, or broken river, as set forth by the evidence, as disclosed in Division II of this argument, it is manifestly impossible, for example, that the underflow at Wichita can be affected by the diversion of the waters of the Colorado Arkansas..

If the argument we have presented in Division II hereof is well founded, and the surface flow of the river has not decreased by reason of the diversion and use of water in Colorado, then, manifestly, the underflow is not affected by such diversion and use.

If the argument we have made in Division I hereof is well founded, then, manifestly, the lands and crops in the Arkansas valley have not been injured by such diversion and use of water in Colorado, for the simple reason that they have not been injured at all, but that the lands, the crops and the general prosperity of the people have been at high tide in the years just passed.

Nevertheless, while insisting upon the controlling effect of the considerations already presented upon this subject, we proceed to discuss the specific ques-

tions as to whether this underflow has in fact decreased, and if so, whether such decrease is in any degree attributable to the diversion of water in Colorado.

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2. The Kansas Brief and Evidence Make the Effect Precede the Cause.

This subject of the underflow is that particular "hobby" of Mr. M. M. Murdock, of Wichita, which he so long and so industriously exploited in the columns of the Wichita Eagle, and it is to be observed that the whole theory emanates from Wichita, which is near the head of that perennial stream we have called the Kansas Arkansas. The people of that vicinity have for years been educated into the idea that there is such underflow, and for fifteen years last past have been taught that this decrease is attributable to the diversion of water in Colorado. The complainant's discussion of this subject starts out with allusions to the discovery of the presence and movement of this underflow by Mr. Murdock.

The first vice apparent, however, in the argument of complainant is the same vice which we have commented upon in section 5 of Division III of this discussion. It is that in date the effect is antecedent to the cause. Mr. Murdock himself goes back for the origin of the decrease as far as 1885 (254). Mr. Harrison, of Colwich, who is next quoted in the brief, attributes the beginning of the decrease in the flow of the river to the year 1885. He says that the subirrigation rises and falls with the flow of the river; that the flow of the river has fallen since 1885 from

two to five feet, and that the sub-irrigation has been reduced, and the level of it has gone down from two to five feet. (273, 274.) Mr. Jurgensen, who is also quoted in the brief, makes the early date of this decrease still farther back. He says:

> "I sank this last well in 1880. It is dry now. It went dry in them dry years, about 1886 or 1887. After that we drove a well pipe down, about twenty-two feet. * * * We were sixteen feet first and we had to go down twenty-two feet to get water. The second well was sunk in the spring of 1880. From 1879 to 1886, in order to get water we had to go down six feet deeper. The last well has never given out; it is there yet today, and it has *not dropped from 1886 to the present time.*" (281, 282.)

Mr. McCandless, quoted in the brief, even in the passage cited, goes back to 1879 for the latest date of high water level with which he makes comparison, and on cross-examination we find that he makes the other limit of time 1887.

> "In my judgment, the Big river at this point had receded about one-half from 1879 to 1887. By the 'Big river' I mean the Big Arkansas." (350.)

Mr. Caldwell, of Hutchinson, quoted in the brief, first noticed the diminution in 1885, and says it was noticed in 1886, 1887, 1888 and 1889.

> "It has been nearly stationary for the last few years. For the last seven or eight

years there hasn't been much change." (356.)

This is the witness whom we have heretofore quoted in this argument as showing that in recent years there is a much greater diversity of crops than there was in former years, and that the lands of the Arkansas valley are now more productive in dollars and cents than they were twenty-five years ago. (358.)

Mr. Edwards, of Kinsley, quoted in the brief, dates the diminution from the years 1883 to 1888. (426.) And in passing we may say that this witness says:

> "I think the maximum difference between the high and low water in the river, as a rule, is not more than three or four feet at the outside." (433.)

Mr. Beeson, of Dodge City, quoted in the brief, gives us some information about wind pumps, and after suggesting the necessity of deepening wells two or three feet, he says:

> "The water has never failed us yet. Three or four feet is as far as I went. I put two mills down there three or four feet deeper than formerly, I think. I got plenty of water, and just as much as I ever had. I never failed." (469.)

Mr. Gallagher, of Dodge City, who is quoted by the brief, presents a theory of some significance, when considered in the light of the complainant's contention. He says:

> "I have a theory about the underflow, and that is that it is not dependent upon local conditions at all, excepting to raise it above a normal condition; *that it don't lower it below the normal.*" (478.)

Mr. Dickinson, of Larned, attributes the loss of water to the year 1887. (1989.) And he says that for the years 1903 and 1904, with the rains and water in the river, there have been good conditions for the growing of crops. (1990.) This witness says, on cross-examination:

> "Yes, the flow for the last ten or twelve months would be better than in 1877, 1875, 1876 and so on. As to whether or not it is a fact that this has always been a very peculiar river and at one time would not have a great deal of water in it and very shortly it might have none, and as to whether that was true before irrigation was practiced to any extent in Colorado, I will answer, yes, sir, that was the fact before irrigation was taken out." (1996.)

And speaking of the period during the last two years, he says:

> "Yes, sir, the level of the underflow is as good now as it ever was. It is three feet higher now for the past year than it was for the six or eight years previously." (2001.)

We have heretofore called attention to the fact that Mr. Mead, who is also quoted on this branch of

the subject by the complainant, attributes the commencement of the decrease of water to 1880.

The witnesses from whom we have quoted are witnesses for the State of Kansas especially cited in the complainant's brief. They are witnesses upon whose testimony the complainant especially relies, and yet we have here clearly set forth the fact that the diminution in the height of the underflow preceded the commencement of irrigation in Colorado. It is no answer to this to say that many other witnesses give a later date as the time when *they* first observed this lowering of the water level. Unless such other witnesses could affirmatively say, which they do not, that the decrease had not in fact commenced prior to the date of their observing it, their testimony does not in the slightest degree militate against that of the witnesses who did observe the decrease prior to 1890. Here are many of the complainant's witnesses who did observe the decrease in the height of the water level in the '80s, some of them back at the beginning of the '80s, long before there was a possibility of Colorado irrigation causing any change in the flow of the river.

We respectfully submit that this in itself makes a conclusive argument against the contention of Kansas, that the diversion of water in Colorado has lowered the level of the underflow in Kansas, and this turns upon a proposition of fact and not upon any mere question of theory. These witnesses are speaking of the time of their own actual observation. We may assume that they are credible witnesses, certainly the State of Kansas can not state otherwise, and the conclusion is inevitable that we must look to some

other cause than Colorado irrigation for the fall of the water level in the Arkansas valley, if such fall has in fact taken place.

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3. The Experience of Kansas Farmers Produced as Witnesses by the State of Colorado Completely Refutes the Contention of Kansas on This Subject.

We ask the court to go with us down the Arkansas river, from Garden City to Arkansas City, and hear what some citizens of Kansas have to say upon the subject.

At *Garden City* George Hill says that he has never had a failure of crops by reason of the water underneath not being in sufficient supply, and has not noticed that his crops were any less on account of the rise or fall of the river. He has never heard any complaint from any of his neighbors to the effect that their crops have been injured by the lowering of the water level, and says:

> "I have never had a failure or diminution of my crops on that account." (1495.)

At *Dodge City* H. Juneau says he has had good opportunity to observe whether the water level has lowered by reason of the well which he has sunk, and which for some distance down is an open well, and he says:

> "The level of the ground water for the last two or three years is precisely the same

as it was when I first sank that well, and that will be twenty years next September." (1535.)

On cross-examination he says:

"Now, when the river has been very low for a long period of time the water in my well would go down to that level; that is, there would be just a little water in it; or it would be simply wet, and it would go down to the same condition it was in twenty years before." (1539.)

At *Larned* George K. Lee says that he hasn't noticed a bit of variation in wells, and

"we are using some of the same wells now that we did twenty years ago." (1548.)

T. G. Payne says that in the Arkansas valley, in his county, the water level has not been lowered, or the value of lands or their productiveness been injured by reason of such lowering. (1552.)

At *Great Bend* W. B. Norris says that when the river is at its normal stage the water level is the same now as it was twenty-five years ago. (1587.) Frank Gibson, whose house is within eighty or ninety rods of the river, says he has dug a well, and adds:

"In the twenty years I don't think it has varied a foot in my place." (1590.)

E. E. Epperson says that he is in the neighborhood of half a mile from the river, and that he doesn't

think that there has been any permanent change in the water level of the ground water since he came to the country, which was in 1884. (1601.)

At *Hutchinson* W. B. Jewell speaks of the water level rising and falling with the rise and fall of the river, but he says:

> "Taking the general water level through the last six years on my place, compared with the first six years I was there, I would say that I can see no difference."

He has been there since 1879. (1635.)

At *Wichita,* which is the head center of the Murdock "hobby," D. M. Sprankle, who has been farming since 1876 on the bottom lands of the Arkansas river, says that—not referring to temporary or local changes from day to day—there has been no change in the water level in the last five years as compared with the first five years he knew the river. (1643.) John Williams, whom we have already described as having lived in the valley for thirty-two years, and as owning five miles of frontage on the river, is of the opinion that the land receives no benefit from the so-called underflow.

> "If there had been no rain, but the river had been high, we would have poor crops. I can't believe that our land would have any more moisture from the river. That is my honest and candid opinion. I don't think the underflow comes back under my lands to help the crops." (1709.)

J. R. Sites says that the underflow has no effect upon the crops, whether it is high or low. (1713.) And on cross-examination says:

> "There is an underflow, but it has no effect upon crops unless we have surface rains. The underflow is near the river. I don't think it affects the ground very far back from the river. If the underflow is within fifteen inches or two or three feet of the surface, as to its having any effect upon the corn crop, I don't believe it has any distance from the river. It might have right at the bank, within a rod or two. Oh, yes, if the underflow was within fifteen inches or two feet of the surface of the soil it would affect the crop if that is true, but that is not true. In this country it never comes within two feet of the top without surface rains. I think I know the conditions all up and down the valley from here to Larned." (1714.)

L. B. Dotson has lived on his farm since 1871. It has a frontage of half a mile on the river. He says that there has been no change in the general water level under his land since he has been there that he could ever notice. (1749.)

At *Winfield* A. J. Shore, who has lived in Palestine township, Sumner county, for thirty-four or thirty-five years, and lives right upon the river, says that the height of the so-called underflow for the last five years is the same that it was in the period from 1880 to 1885. (1757.) This witness says that the rise and fall of the water level is affected by the rise

and fall of the river in the immediate vicinity of the river. He has never found it extending a mile away (1758), and he says that where he lives he does not think the underflow has any effect during the growing season near the surface; and he also says that as to corn land, if the underflow was eight feet below the surface, it would be better than though it was six feet below the surface. (1759, 1760.)

T. C. Price, of Winfield, says that he does not think there has been any perceptible change in the average water level in twenty years on his land, part of which is on the river bank. (1803.)

These citations will serve to illustrate the great mass of evidence produced upon this subject by the State of Colorado through the testimony of Kansas farmers. It is, of course, true that in the immediate vicinity of the river, where the banks are low and consist of sand or porous soil, the water level in the ground will rise after the river rises, and will fall as the river falls. This is an experience not confined to the Arkansas valley. It is universal, wherever the land adjacent to the flowing water of a stream is of a porous character. The important point is that there is no change in what may be called the normal level of the underflow in the Arkansas valley, as a result of irrigation in Colorado. In the olden times, before irrigation had commenced, floods would come in the river and the water level would rise. In that period of time drought would come; the river channel would become a dry bed of sand, and the water level would go down accordingly. It does the same since irrigation in Colorado commenced, no more, no less.

4. The Underflow Derives Its Main Supply From Rainfall, and This "Underflow" Is but the Ordinary Water Table of the Country.

On this subject we call attention to some evidence of scientific observers, whose testimony has been produced by the United States.

Willard D. Johnson, of the U. S. Geological Survey, describes the ground water surface or water table of the great plains region, and says:

> "It is a universal plane. And this ground or sheet water extends under the surface of the plains everywhere, and coincides with the surface of the plains where valleys have been cut down through the surface until they meet this ground water plane. There is no particular difference whatever between the sheet or underground waters in the Arkansas valley and the sheet or underground waters of the other plains sections. That is, no difference in character. Yes, in this investigation I made a study with respect to the source of supply of these sheet or underground waters. That was the principal subject of my investigation in that region. From the investigations I have made with respect to this matter, I would say that the origin of underground waters everywhere is rainfall. The ground water moves from one region to another, and while it may be rainfall in one region it may

be rainfall transported in another region, but in the region of the high plains, although the origin of the ground water is in very small part from the mountains, it is, in insignificant part, from the mountains, and almost wholly from the local rainfall." (1222.)

This witness further says:

"I made an examination of the ground water by sinking wells to determine its level and its slope, except where wells already existed which would serve the same purpose, and I found that the ground water surface rudely paralleled the ground surface, but was not quite so irregular." (1223.)

Mr. Johnson describes the sinking of a series of wells on lines at right angles with the Arkansas river in western Kansas, and, as a result of very extended investigations, he says:

"The ground water plane sloped toward the river. The ground water was feeding into the river bed. The river bed served—because it fed so slowly—as an evaporating pan for evaporating what was contributed from the slopes." (1224.)

The entire evidence of Mr. Johnson is interesting and valuable on this subject of the water plane.

On cross-examination, Mr. Johnson, among other things, says that if it is true that the ground water in the Arkansas valley extending back of the foothills

on each side has gone down from four to six feet, he should attribute it to a change of climate, but he thinks it is a question as to whether it has so fallen. (1233.) In this connection he says:

> "And my opinion is that the people in that region are seeking facts to explain conditions and they neglect wells that have risen and cite cases of those that have gone down. I wonder if that is not so. If I were going there to see, I should want to examine all wells. I found some wells in Garden City going up and others going down. I tried to get at the explanation of those rising where others fall, and I found it was apparently due to a little over-irrigation in that neighborhood." (1234.)

N. H. Darton, of Washington, D. C., geologist in the Geological Survey, was produced as a witness by the United States, and he says that he has recently made an investigation of the Arkansas river in the vicinity of western Kansas. This witness states that the ground water in that vicinity is due mainly to the water that flows on the slopes that rise out of the valley and not from the river. "A small amount in the immediate vicinity of the river is present through percolation from the river bed, and by "immediate vicinity" I mean a distance exceedingly indefinite, a few rods, perhaps—a very short distance." (1257.)

Mr. Darton thinks that the ground water flows in along the bed of the stream, and supplies water in that way to the river as a whole.

Professor F. H. Newell, chief engineer of the Reclamation Service, produced as a witness by the United States, says:

> "This underground or sheet water extends along the valley of the Arkansas river as a part of the general sheet water underlying the entire plains area. Yes, I have made investigations with respect to the sheet or underground water along the Arkansas river in Colorado and Kansas. In regard to its source, as a rule it is derived most largely from local rainfall, as testified by the fact that the great body of the sheet water is at a higher level than the level of the rivers as a rule." (1266.)

In passing, we would call attention to a statement by Professor Newell which has a significant bearing upon the main subject now under discussion. He says:

> "Whenever the upper river was in flood and there was a considerable flood flow the diversion of the upper waters would undoubtedly have an appreciable effect on the lower river. When the river was at its lowest stage and it was possible that its waters would entirely disappear before getting down into the vicinity, say, of Garden City, presumably there would be very little effect from taking it out entirely in Colorado." (1266.)

Professor Newell says:

> "The word 'underflow' I use simply as a popular word which has been applied to ground water, particularly in the arid region; but I have in mind simply the occurrence of ground water and its movements towards points of least resistance, and in using that word to-day it was my intent to simply refer to the ground water and its appearance. So far as I am aware, there is no line of demarcation between the ground water throughout the plains area and that occurring in the valley of the Arkansas river." (1278-9.)

Professor Charles S. Slichter holds the chair of Applied Mathematics in the Engineering college at the University of Wisconsin, and he is a consulting engineer for the United States Geological Survey. He was produced as a witness for the United States. He has made recent investigations of the Arkansas river and of the underflow. On the immediate subject of discussion, the following expressions will show the views of Professor Slichter:

> "We concluded from our investigations that the major portion of the ground water came from the rainfall on the lands north and south of the river. We were able to conclude that a very large portion of it originated in rainfall, and I can give a definite numerical answer to that if you desire to restrict the north and south limit." (1336.)

He then proceeds to illustrate as to the first principal station two miles west of Garden City, in the area extending to the north 2,500 feet from the river, and he says over two-thirds of the additions to the ground water was contributed by the rainfall, and less than one-third contributed by floods in the river, if the time be made to include a period of flood. This was the result of very careful study, all of which is explained by the witness. (1336-7.) Professor Slichter confirms what we have already quoted from Kansas farmers, to the effect that the influence of a rise in the river is confined to the immediate vicinity of the flowing stream.

> "Speaking generally of the river through Kansas and excluding special or peculiar spots, I would say that this ground water would show some influence from 400 to 1,000 feet from the river on account of a rise in the river. That is, a thousand feet is about the distance from the river that the rise or fall of the water in the river will affect the level of the ground water. That distance is a fair maximum for western Kansas, I should say." (1350-1.)

Professor Slichter's examination of the river was in 1904, when the large canals of Colorado had been in operation for more than ten years. On cross-examination he is asked a question and answers as herein quoted:

> "Q. If it be true that the Arkansas river in its natural condition, before touched

for the purposes of irrigation, was a stream which had water in it through western Kansas for only a part of the year and there were months in practically every following year when there was no flowing water in it, then in your judgment would that stream under those conditions have furnished any such amount of water to the ground waters of the country through which it traveled as would be of any practical benefit for any purpose? A. I would expect under those circumstances to find the ground water under the same conditions as it is found at present, that is, so far as the river has any influence upon it." (1352-3.)

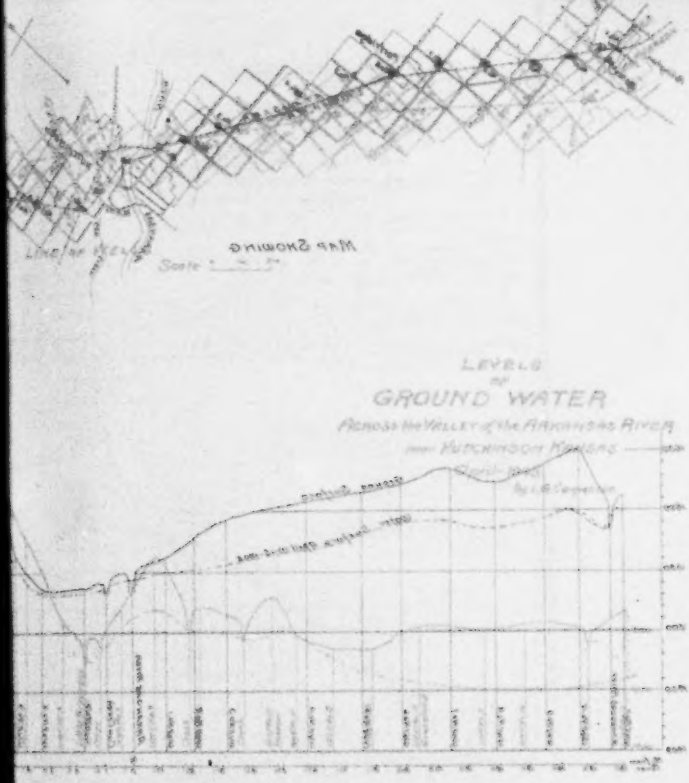
The defendant, State of Colorado, introduced as its exhibit number 24, certain plats and profiles taken from the appendix of the report of the chief engineer of artesian and underflow investigation of the United States Department of Agriculture. This plat gives in cross section north and south of the Arkansas river the undulations of the surface, the relative altitude of surface points, including the bed of the Arkansas river, the geological conditions found beneath the surface of the river by the sinking of certain wells, and other interesting information, and a separate plat and profile is given for the vicinity of Garden City, of Dodge City and of Great Bend. We here insert a reduced transcript of this exhibit, but with straight lines placed thereon connecting points of sub-

terranean flow of water as disclosed by the wells mentioned.

The State of Colorado has caused a great many wells to be sunk at different places in the valley of the Arkansas, with the view of ascertaining the level of the underflow, as compared with the level of the stream at varying distances from the river, and we ask the especial attention of the court to Colorado Exhibits 27, 31 and 32, as giving some of the results of these investigations. Exhibit number 27, reduced transcript of which is here inserted, shows the descent of the underflow towards the river from a point 1,800 feet distant from the river, and through the intervening territory. This diagram also shows the effect of a flood of October 5th, 1904, which caused a considerable rise in the river, then the effect of this rise is shown by a change in the condition of the water level in the vicinity of the stream, which effect, as changing the slope of the water level, is manifested to a distance of 800 feet from the flowing water of the stream.

Exhibit 32 is a plan map, which shows the position of the various wells, and the position of lands owned and testified about by certain witnesses of the complainant, and Exhibit 31 shows the condition on lines substantially at right angles with the river northeasterly and southwesterly from Hutchinson. These exhibits (reduced transcripts of which are here inserted), taken with the evidence of Professor Carpenter submitted in connection therewith, clearly establish the proposition which is in accordance with the scientific observation of the engineers of the

EXHIBIT 31


LEVELS
OF
GROUND WATER
ACROSS THE VALLEY OF THE ARKANSAS RIVER
AT HUTCHINSON KANSAS

terranean flow of water as disclosed by the wells mentioned.

EXHIBIT 3

The flood of Colorado has caused a great many wells to be sunk at different places in the valley of the Arkansas, with the view of ascertaining the level of the [illegible] with the level of the stream as varying [illegible] ask the especial attention [illegible] Exhibits 27, 31 and 32, as giving some [illegible] of these investigations. Exhibit number 27, [illegible] transcript of which is here inserted, shows the [illegible] of the underflow towards the river at a point 1,200 feet distant from the river, and through the intervening territory. This diagram also shows the effect of a flood of October 5th, 1904, which caused a considerable rise in the river, then the effect of this rise is shown by a change in the condition of the water level in the vicinity of the stream, which effect, as changing the slope of the water level, is manifested to a distance of 800 feet from the flowing water of the stream.

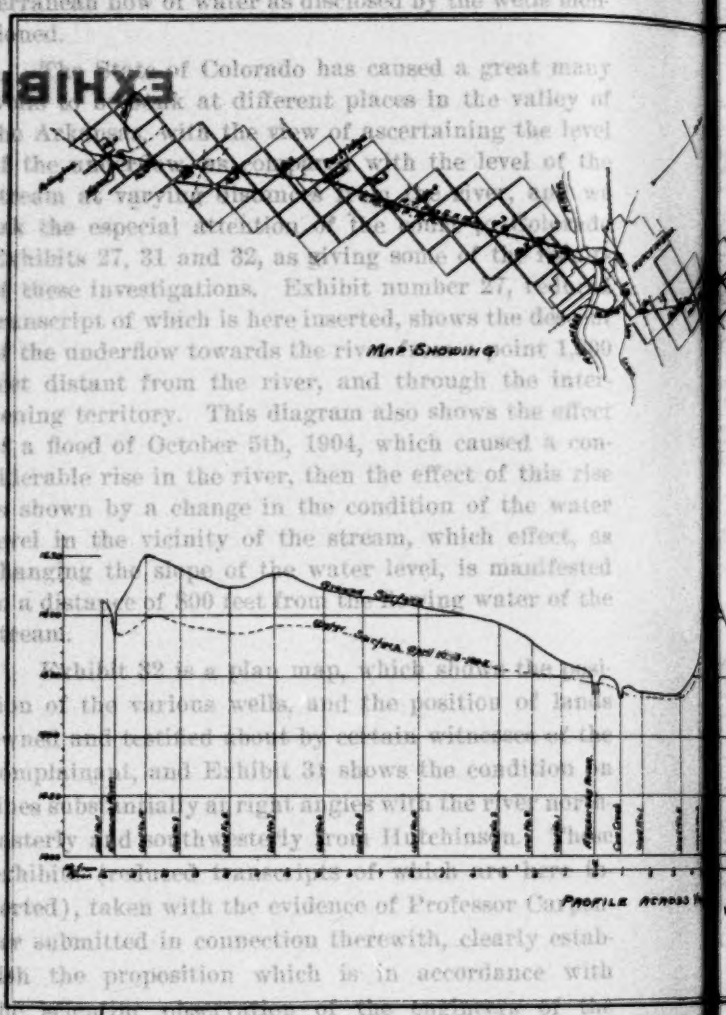
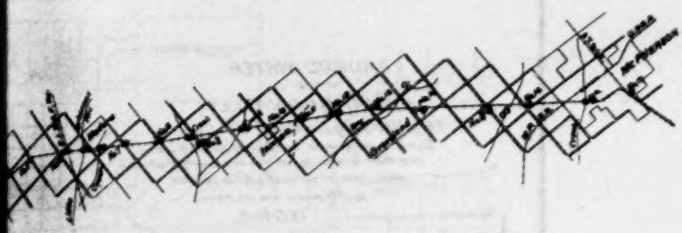


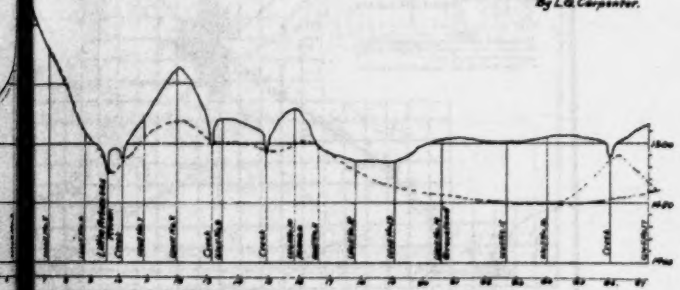
Exhibit 32 is a plan map, which shows the location of the various wells, and the position of lands owned and controlled about by certain witnesses on the examination, and Exhibit 31 shows the condition in lines substantially at right angles with the river, northeasterly and southwesterly from Hutchinson [illegible] exhibits, which [illegible] of which [illegible] serted), taken with the evidence of Professor [illegible] submitted in connection therewith, clearly establish the proposition which is in accordance with

EXHIBIT 32



LINE OF WELLS Scale 1 in. = 1 mi.

LEVELS
OF
GROUND WATER
ACROSS the VALLEY of the ARKANSAS RIVER
near HUTCHINSON KANSAS
April - 1905.
By L.G. Carpenter.



Vertical Scale 1 in. = 50 ft.

COLO. EX. 31

EXHIBIT 32

EXHIBIT 35

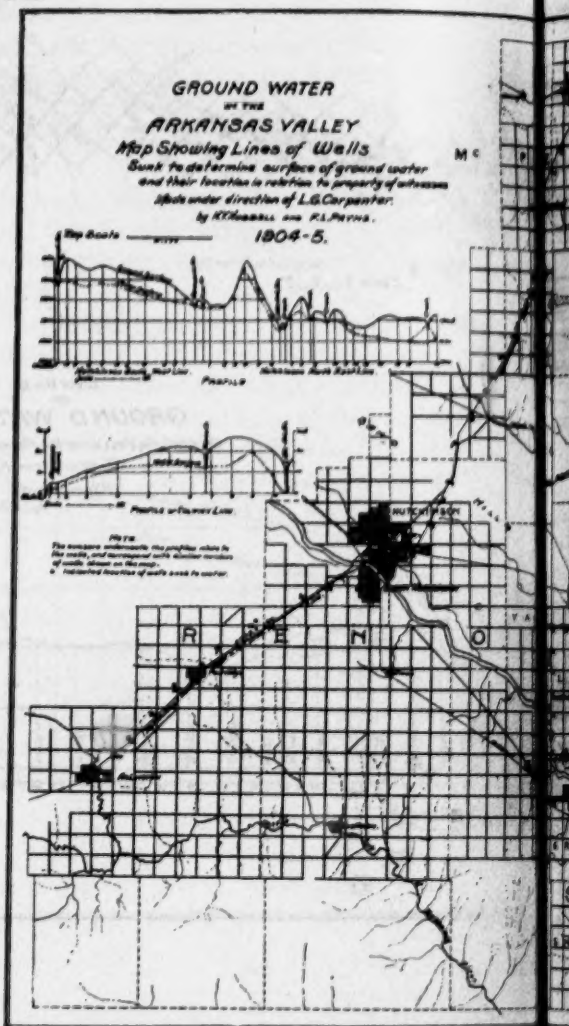
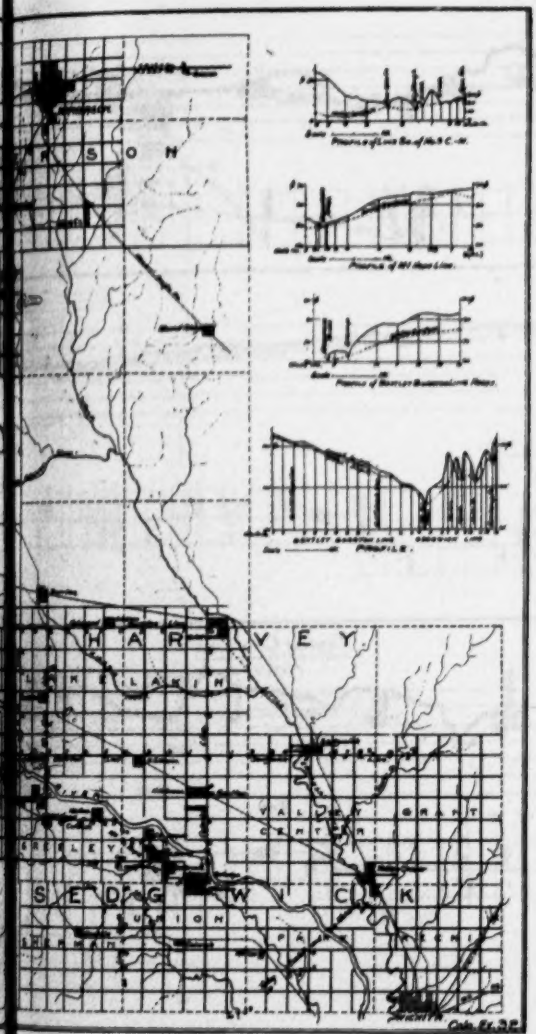

GROUND WATER
OF THE
ARKANSAS VALLEY
Map Showing Lines of Wells
Sunk to determine surface of ground water
and their location in relation to property of witnesses
Made under direction of L.G. Carpenter
by K.T. Russell and F.S. Payne.
1904-5.
Map Scale
PROFILE
PROFILE of Flowing Line
NOTE
RENO
HUTCHINSON

EXHIBIT 24



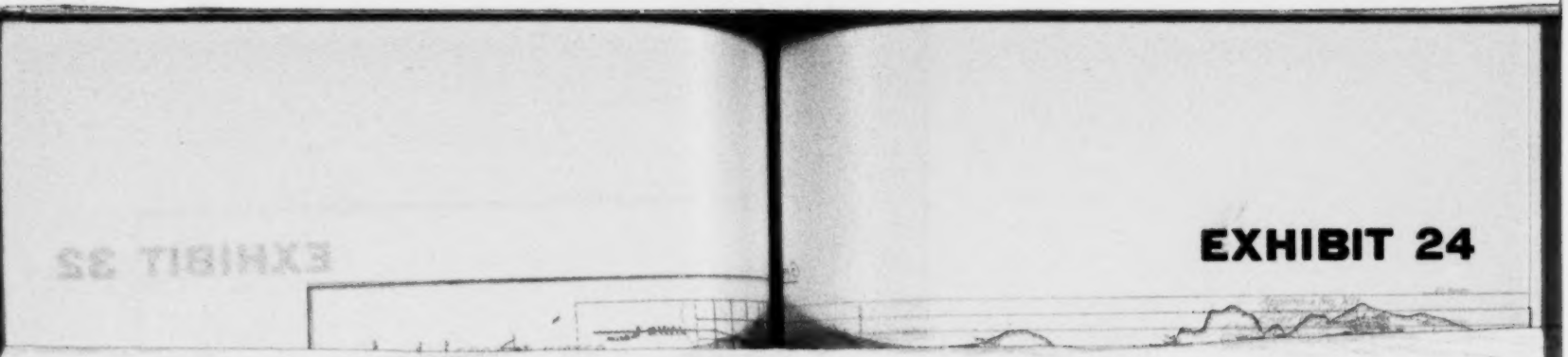
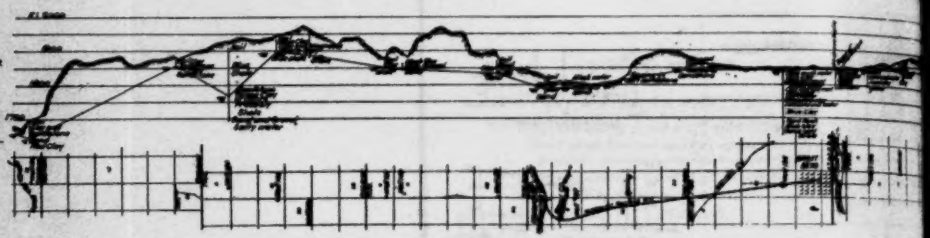
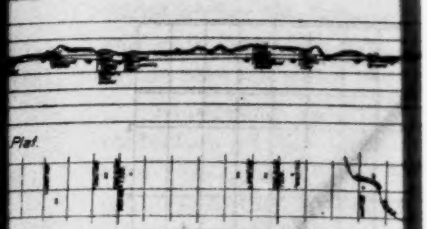


EXHIBIT 24

EXHIBIT 24

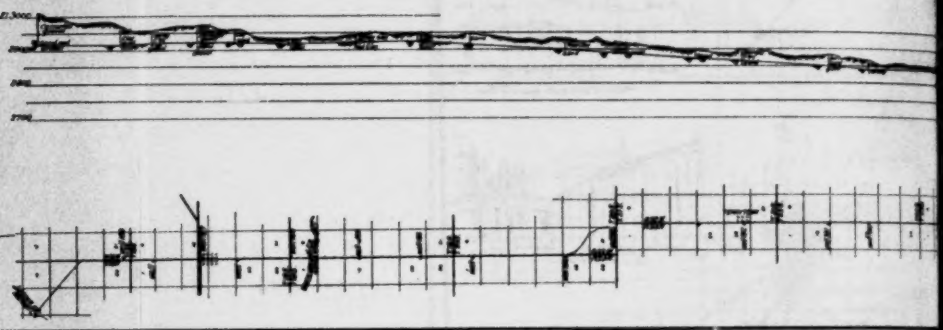
Appendix No. XII
to the report of the
CHIEF ENGINEER
Artesian and underflow investigation
United States Department of Agriculture

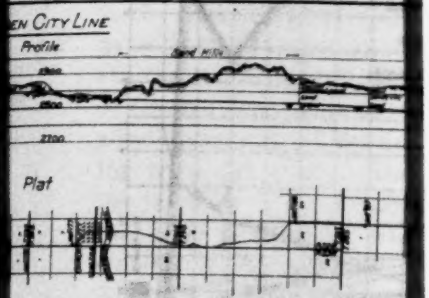
PLAT AND PROFILE
OF
GREAT BEND LINE



Appendix No. X
to the report of the
CHIEF ENGINEER
Artesian and underflow investigation
United States Department of Agriculture

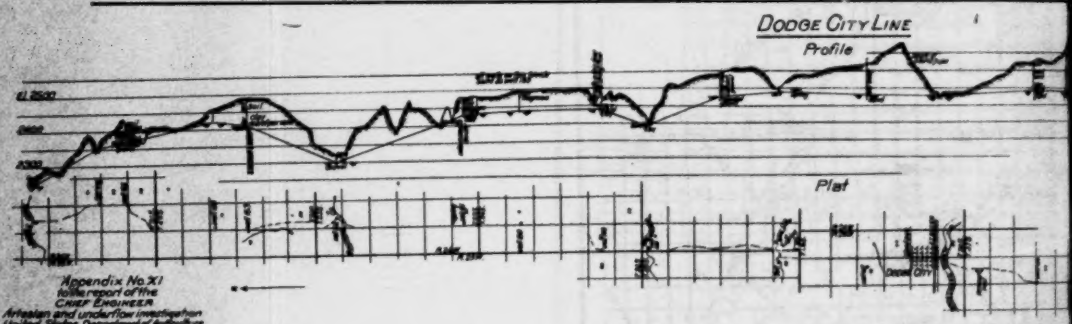
PLAT AND PROFILE
OF
GARDEN CITY LINE

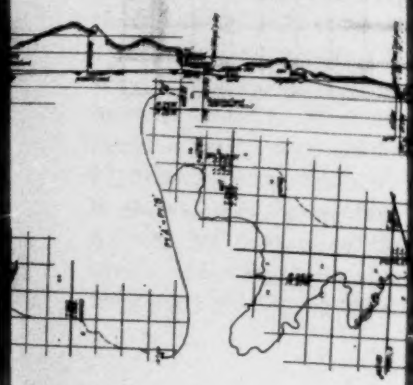


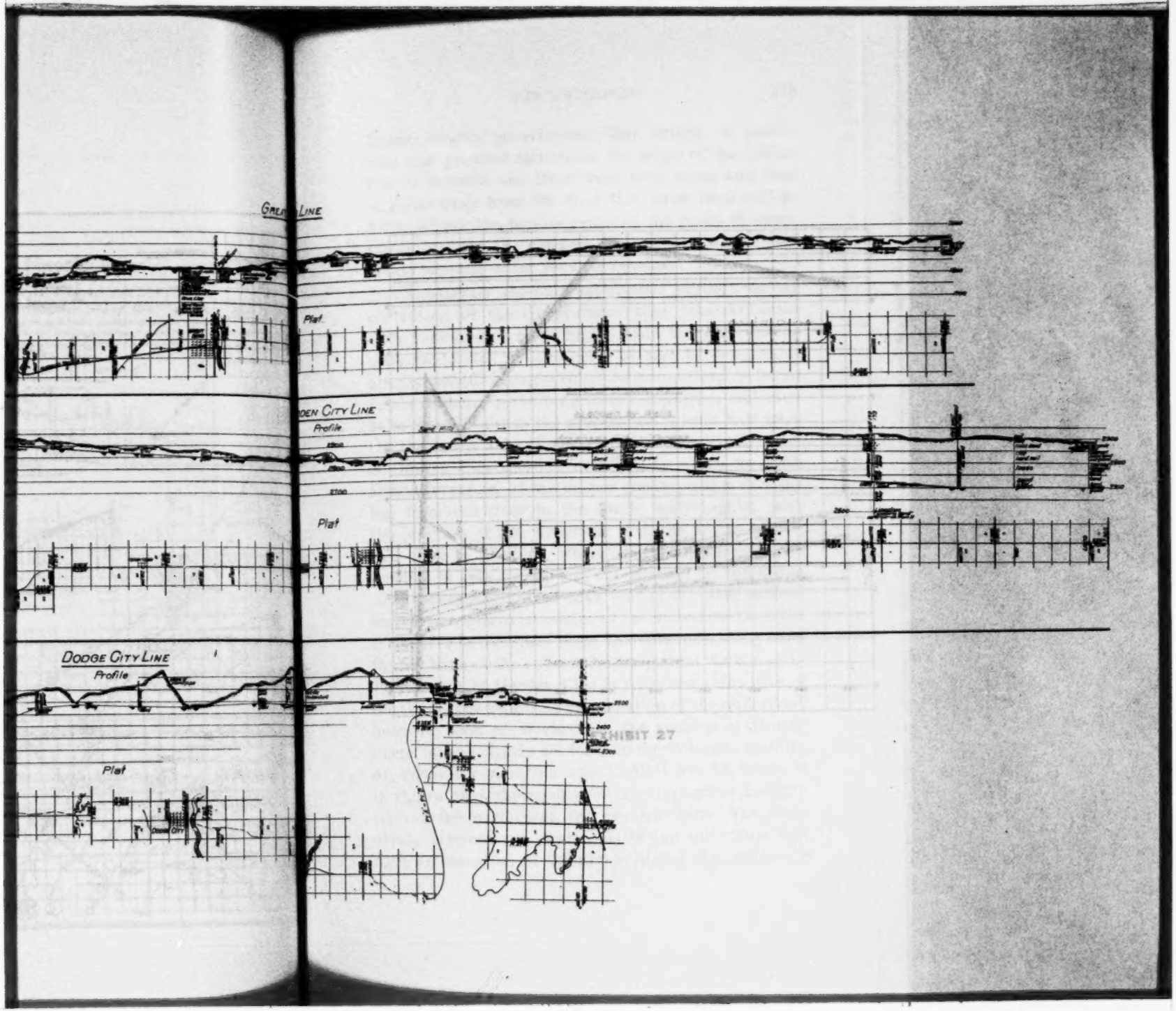


Appendix No. XI
to the report of the
CHIEF ENGINEER
Artesian and underflow investigation
United States Department of Agriculture

PLAT AND PROFILE
OF
DODGE CITY LINE






Plat
Profile
Plat
DODGE CITY LINE
Profile
Plat

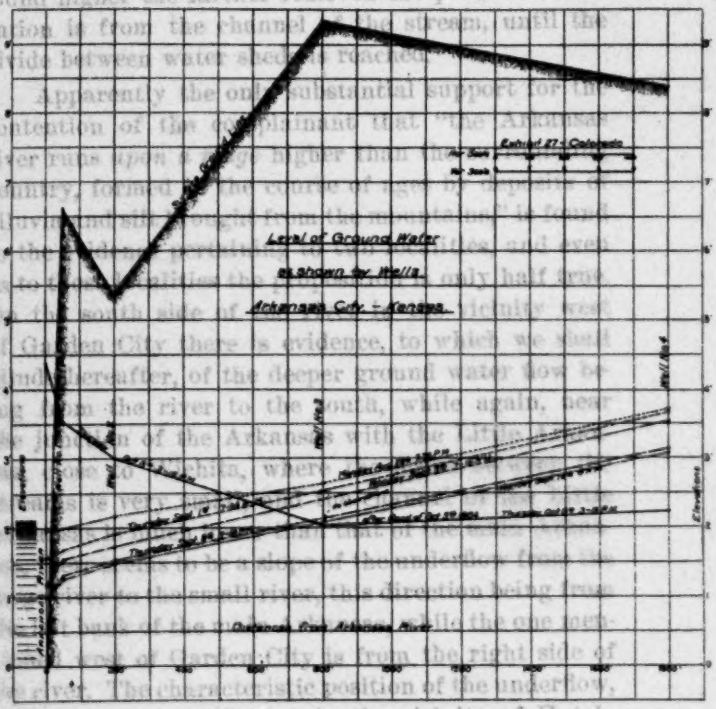


Exhibit 27 - Colorado
Level of Ground Water
as Shown by Wells
Arkansas City - Kansas

EXHIBIT 27

United States government, that except in particular and peculiar situations the slope of the underflow is towards the river from both sides, and that in going away from the river this water level will be found higher the farther removed the point of observation is from the channel of the stream, until the divide between water sheds is reached.

Apparently the only substantial support for the contention of the complainant that "the Arkansas river runs *upon a ridge* higher than the surrounding country, formed in the course of ages by deposits of alluvia and silt brought from the mountains," is found in the evidence pertaining to two localities, and even as to those localities the proposition is only half true. On the south side of the river in the vicinity west of Garden City there is evidence, to which we shall allude hereafter, of the deeper ground water flow being from the river to the south, while again, near the junction of the Arkansas with the Little Arkansas, close to Wichita, where the space between the streams is very small, and the channel of the Little Arkansas is much lower than that of the main Arkansas, there seems to be a slope of the underflow from the large river to the small river, this direction being from the left bank of the main Arkansas, while the one mentioned west of Garden City is from the right side of the river. The characteristic position of the underflow, however, west of Wichita, in the vicinity of Hutchinson, is very clearly set forth in the Colorado Exhibit 31, taken in connection with Exhibit No. 32, where it is shown that the surface of the underflow roughly follows the surface of the ground above, and on a divide between two water sheds the underflow will have an elevation at the divide higher than either of

the streams on either side, substantially according with the elevation of the ground itself.

The Kansas brief, at pages 95 and 96, in discussing the subject of the underflow, alludes to the very rapid disappearance of the water of the Arkansas in western Kansas, a fact which we have utilized in section 4 of Division II of this argument. Kansas seems to attribute a part, at least, of its loss of underflow to this rapid disappearance of the water. After speaking of the fact disclosed by the evidence, that the underflow has, since the cultivation of the soil, received larger contributions from precipitation upon the surface, the brief then continues:

> "The *loss of water in the river itself* has been so excessive in the last fifteen years as to overcome this additional amount of supply to the underflow from the more largely absorbed rains on the uplands, and has *materially lowered the original level* of the underflow throughout the whole valley. This decrease in the visible flow of the river has more than counterbalanced the increased supply from the rains upon the uplands." (Br., 95, 96.)

And then counsel proceeds to cite the evidence showing the rapid disappearance of the water between Coolidge and Dodge City in the flood of May 3rd, 1904. We conclude that it is intended by this argument to say, not that the water which so disappeared has itself contributed to raising the level of the underflow in the vicinity of Wichita, but that, on the contrary, its disappearance is a factor in causing the lowering of the underflow east of Dodge City. It is doubt-

less true that if all the flood waters, which now sink in the sands, could continue in the open channel down past Wichita, they would to some extent raise the level of the underflow in the immediate vicinity of the river. But it is very certain that where, as we have shown, 80 per cent. of a flood absolutely disappeared from the flowing stream between Coolidge and Kinsley, all in about two days, and this disappearance was caused, not by flow down the river, but by some cause operating between Coolidge and Kinsley, it is certain, we say, that so large a volume of water has not in so short a time found its lodgment in the adjacent soil, above the ante-flood level of saturation. Immediately upon entering the soil the water meets a resisting medium in which movement must be excessively slow, and in which, even "water column" pressure is diminished by the resisting medium. The increased "water column" pressure resulting from a rise of four feet in the river would in any event be very slight. It seems to us very clear that the water, having the opportunity with a rapid descent and open channel to pursue its course unresisted down from Coolidge to Kinsley, would take the open channel course rather than go through the resisting medium of the adjacent soil, and that the explanation for the rapid loss of water in such a flood, and especially the large surplus thereof, after due allowance for evaporation, must be found in some other avenue of exit. This would seem, also, to be the conclusion of the counsel for Kansas from the argument above cited. It is, however, very clear that this disappearance of flood water is the result of some *natural* cause, and that it is not in the slighest degree attributable to any artificial cause, either in the

nature of irrigation or otherwise, and we find the Kansas brief here giving emphasis to the existence of a natural cause which takes the water out of the stream before it could reach a locality where it would aid in keeping up the level of the underflow.

No explanation of the sudden loss of this water in western Kansas, as manifested in times of flood, and even in mean monthly flow, as we have heretofore shown, is attempted by counsel for the State of Kansas, and, we may say, it has not been made the subject of special consideration by any of the expert witnesses.

It is not incumbent upon us, in our defensive attitude, to explain what becomes of this great volume of water that so suddenly disappears, and yet the inquiring mind naturally seeks some explanation of such a phenomenon. In the opinion of the writer of this brief the evidence in this record furnishes the data for a rational and simple explanation, and, at the risk of slightly expanding this already too extensive discussion, we call attention to certain facts suggested by the evidence.

(1) The defendant has introduced a map of the Arkansas river and its tributaries from its source to its mouth, as Colorado Exhibit No. 3. An examination of that map will disclose the fact that a bend in the little Cimarron creek, or, as it is sometimes called, the north fork of the Cimarron, is only about twenty miles south of the Arkansas river at the bend of that river between Syracuse and Garden City.

(2) On a straight north and south line, connecting this bend of the Arkansas with the bend of the Little Cimarron, will be found the lower terminus of Bear creek, a stream which at that point sinks into the sands and is lost (682, 683, 1358); and this point where

the water of Bear creek thus sinks into the sands is about midway between the Arkansas and the Little Cimarron. Now, by examining Colorado Exhibit No. 24, it will be observed that the vertical cross section, showing the profile of the Garden City line, and the wells sunk along that line, show these wells penetrating the gravel at a constantly lowering horizon as we go south from the Arkansas river. The most southern well shown is only one mile north of the township line on the south boundary of Township 30. This cross section is two miles west of Garden City, but even at this point the last well is on the south side of the present sandy surface divide separating the drainages of the Arkansas and the Cimarron, and is within a very short distance of the main Cimarron itself. At the well last mentioned, as shown by the profile, the gravel is 125 feet lower than in the first well south of the Arkansas river, and the successive wells between show, as above suggested, the gradual lowering of the gravel stratum. In the reduced transcript of Colorado Exhibit 24, inserted in this argument, a line has been drawn connecting the points in these successive wells where the gravel stratum is reached, and this clearly shows to the eye the rapid fall of this stratum of gravel from the present line of the Arkansas river (west of Garden City) to the Cimarron.

Further east the exactly opposite condition is found. If we take the plat and profile of the Great Bend line on the same exhibit (Colorado Exhibit 24), we shall find that well 134, one mile south of the river, strikes the gravel at about 1,800 feet elevation; that well 129, eleven miles south of the river, finds the gravel at 1,850 feet elevation, and (omitting interven-

ing wells) well 121 finds the gravel at about 1,900 feet elevation, so that in the vicinity of Great Bend the slope of the gravel stratum is not away from the Arkansas river, but is towards it.

(3) We find in the record the following testimony. Speaking of the evidence in reference to the rapid disappearance of this water, Professor Newell says that, presumptively, the loss by evaporation during that period would be quite small, and that the water must have disappeared in the ground, a small proportion, perhaps, going into the air. (1275.) Professor Newell also says that the valley of the Arkansas river shows very clearly that the stream has been always, or, at least, for ages, a shifting stream, running first in one place and then in another; that the entire area is made up of shifting stream channels coming from the mountains, and that it might be true in the immediate valley of the Arkansas that there were old river channels of coarse gravel and sand, in which, if a well were sunk it might show the effect of the river very readily, though removed some considerable distance. (1287.)

Mr. W. D. Johnson, speaking of the movement of underground water, says that through gravel courses or gravel channels, or gravel streaks, it moves relatively rapidly. That

> "the gravel is arranged in streaks laid down by little streams that build the plains, and so the gravel constitutes a sort of pipes, you might say, small in amount—of course, 'pipe' is a bad term to use, but gravel courses I have spoken of them as being—pipes or chan-

nels through which the water circulates more rapidly than elsewhere." (1241.)

Mr. Johnson describes the Cimarron as one of the typical rivers of the great plains, sinking into the sands and making a broken river. He says

> "that river, right adjoining the Arkansas and parallel to it, is a fine example of that kind of a stream. It runs from the Cimarron headwaters with considerable water and gradually that diminishes, and I know very well what becomes of it. It runs through a river channel that is quite broad and well defined—a flood flow channel, as I used to call it, made by floods along the Cimarron; but normally the Cimarron fails and disappears, leaving a broad belt that is without a stream." (1251.)

(4) The most direct route for the Arkansas river from Coolidge to the sea would be by cutting across the narrow neck of land which separates the present Little Cimarron from the present Arkansas at the point where Bear creek sinks into the sands, and thence following the Cimarron to its junction with the present Arkansas, which is by far the most direct line from the lower end of the perennial Colorado Arkansas to the present mouth of the main Arkansas, where it empties into the Mississippi. The divide which at this date gives a surface separation to the drainage of the Arkansas from the drainage of the Cimarron in the vicinity we have been speaking of, consists of hills of sand, which have manifestly drifted into their present position by the action of winds

(360), and it is a reasonable conclusion, from well known like action in other places, that the present position of the Arkansas through Kansas is a position to which it has been shifted from the south by the accumulation of sand on and north of the present Cimarron.

We consider that a reasonable and natural explanation of the rapid disappearance of such tremendous volumes of water in the western part of Kansas is found in the fact that from the "sieve" this volume of water drains, as it were, through a funnel, into an old gravel bed, which was once in primeval ages the actual channel for the course of the stream which comes from the mountains of Colorado and seeks a route toward the sea, and that under the sink at Bear creek, and under the sands of the Cimarron, there is an ancient channel which is the avenue of exit for the waters which now so quickly disappear from the Arkansas.

While this explanation is not at all necessary for the purposes of this suit, yet, as an explanation derived entirely from the exhibits and evidence in this case, and being the only reasonable theory that has been vouchsafed for a very interesting natural phenomenon, we have thought it worth while to give so much space to it in this discussion.

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5. The June Rise.

In the submission of testimony the complainant dwelt a great deal upon the diminution of what it calls the "June rise," which it is contended by Kansas was a regular characteristic of the flow of the river in early years, and which it says has discon-

tinued in later years. This expression, "June rise," is unknown in Colorado. It is not an expression which has moved down the Arkansas. The expression came over from the Missouri to the Arkansas. It is apparent, in this evidence, that it has come up the Arkansas into central Kansas, and that the occasion of any such "June rise" corresponds with the cause for what is often mentioned as a spring rise in the streams of humid countries of about the same latitude. It has nothing to do with the flow of melted snow from the mountains.

Edward Huston of Little Rock, testifying for the United States, intervenor, says: "I have heard the expression the 'June rise.' We still have the June rise in the river. This rise gets its supply from the spring rains." (1301.) He says further: "The big spring rises come from above Fort Gibson, and they come regularly in these later years, as regularly as they used to." (1302.)

P. R. Van Frank, Jr., of Little Rock, Arkansas, a civil engineer for the War Department, produced as a witness by the United States, intervenor, says:

> "We have here, from below Fort Gibson, what is known as the June rise. In respect to the cause of that June rise, I would say rainfalls in southeastern Kansas, southwestern Missouri and eastern Indian Territory. It comes from local rainfall. By that I mean this—that the melting snows in eastern Colorado would never give us a flood here." (1310, 1313.)

If there has been an apparent diminution in central Kansas of a spring rise in the river, it is due to a diminution in rainfall. Intervenor's Exhibit 17 gives the rainfall at Dodge City for every month, beginning with 1875 and continuing down to 1904. If the months of May and June are taken, we shall find the following facts: That in the fourteen years (1876 to 1889) the aggregate rainfall at Dodge City for the months of May and June was 104.5 inches. That for the fourteen years (1890-1903) the total rainfall in the months of May and June was 85.37 inches, and the deficiency is fairly well distributed through the period. If the "June rise" is attributable to rainfall, we have here an explanation of its being less in the years subsequent to 1890 than it was in the years preceding 1890.

We have already called attention to the fact that witnesses for Kansas were instructed to exclude the year 1904 in telling about the flow of the river and the underflow. Now, upon an examination of intervenor's Exhibit 17 we shall find that the four immediately preceding years were dry years in the months of May and June; that for these months during that period (1900-1903) the normal precipitation at Dodge City would be 26.36 inches, but that the actual precipitation was only 19.41 inches. We do not need to look farther for an explanation of a phenomenon which seems to have created the opinion as to the diminution in recent years of what the Kansas witnesses call the "June rise." But in this connection we call attention to our discussion of the history of the river, especially for the month of June. (*Supra,* page 110.)

When we consider the character of the Arkansas river in its natural state, as shown by the last century of its history, when we consider the established facts of science and observation as to the character, position and movement of the underground waters in the Arkansas valley, we are compelled to the conclusion that the diversion and use of the waters of the Colorado Arkansas have not in the slightest degree diminished the so-called underflow in the Arkansas valley in Kansas.

V.

THE DIVERSION AND USE OF THE WATERS OF THE COLORADO ARKANSAS HAVE NOT CAUSED THE BED OF THE STREAM IN KANSAS TO BE NARROWED, NOR ISLANDS TO FORM THEREIN, NOR THE DANGERS FROM FLOOD TO INCREASE.

If our argument as to the character of this river, and upon the alleged diminution of its flow, and as to the character and fluctuations of the underflow, is sound, then the proposition which we have here just stated follows as a natural sequence.

But, independent of the argument already presented, we submit that the evidence for the complainant, taken alone, has wholly failed to establish the Kansas contention on this subject.

It is undoubtedly true that the bed of the Arkansas through Kansas, and especially western and central Kansas, is higher than it has been in some antecedent periods of history. There has for centuries been coming down from the Rocky mountains mud and silt, which must be deposited somewhere, and the

process of deposit in the bed and along the banks and on sandbars and islands is, as shown by all this evidence, a process that has been going on since the river was first known by man. In comparatively recent years what was an almost uninhabited country has become quite densely populated and towns have grown up. The tendency to the narrowing of the channel and the formation of islands has been aided by human action, and by human action we mean in Kansas and along the banks of the stream in the very localities where the narrowing effects have been observed.

Professor Newell, when being cross-examined by counsel for Kansas, in reference to the possible causes for the recent exposure of piles under the bridge at Wichita, where it is claimed those piles were originally under water, finds such a cause in the fact "that the contraction of the water way *which is going on in all rivers* has resulted in a deeper scour and a general lowering of the water plane of that area." (1285.)

He further says:

> "The contraction of water ways in towns is a very complicated affair in the behavior of the scour of the stream." (1285.)

While the defendant has given considerable evidence in refutation of the contentions of the complainant on the question here under discussion, yet, it will be ample and sufficient for our purpose to call attention to statements made by witnesses for the State of Kansas, and we shall find from them that in places the stream has not narrowed where Kansas counsel supposed it had; that in most all places the phenomenon spoken of originated long prior to the diversion

of water for irrigation in Colorado, and that specific instances are shown by these witnesses of the action of men causing accretions to lands.

L. J. Pettijohn, of Dodge City, says:

> "I have lived in Dodge City a little more than seven years, and the river was no wider in the length of time I have known it than it is now. I think it is about the same in the last seven years." (1903.)

W. H. Poovey, of Oxford, says:

> "I don't think there are any more islands in the river now than during the earlier years." (2204.)

W. H. Johnson, of Larned, says:

> "As to there being more sandbars than there were in the river and higher sandbars than when I came here, I will answer no, I can't say that. It whips it up out of the middle and drives it either on one side or the other. As to whether there are more or larger islands in the river now than thirty years ago, I will answer, no, sir. As to whether the sandbars have grown over with trees now that were bare thirty years ago, I will answer, not along by me, but farther up there is." (1981.)

S. S. Dickinson, of Larned, says that when he came to the country there was no timber along the stream.

"Looking up and down, there was not a willow or switch along the stream as far as you could see either way. It was just perfectly bare sand, like my homestead, a good deal of it, was bare sand. And as the river went dry the cottonwood seed began to gather and grow, and to-day west of my house in the river there is over twenty-five acres of islands formed, some with cottonwood trees on, some of them *eighteen or twenty* inches through. They have all grown since I settled there on the place—all grown since *1881 or 1882*." (1989.)

This witness also speaks of the fact that some neighbor had filled up along the bank further up the river so as to make the islands come to his mainland, with the result that "now I have fifteen or twenty acres of good timber accretion running up the river." (1989.)

The same witness says:

"As to the time when these cottonwoods I spoke of began to grow, I will say, in 1883 I was handling cattle on the river and frequently you would see a little bunch of bars that used to be rough with cottonwoods starting. *Along in 1883*, I think, was the first time I noticed it." (2000.)

Further on the same witness says:

"As to whether I know of any place along the river in the vicinity of Larned where man has narrowed the river by nar-

rowing the bridges and building abutments out into it, and embankments, I will say he has done it right here at our bridge. It has been narrowed forty feet." (2003.)

J. H. Smith, of Sterling, speaking of the formation of islands, and of the accretions along the banks, says:

"The accretions have been forming right along in the last *eighteen or twenty* years. It has been narrowing down." (2069.)

J. R. Mead, of Wichita, the author of "A Dying River," tells us of islands existing in the stream as early as 1867:

"At times of low water sandbars were sticking up *almost anywhere* in the river; there was occasionally a large permanent island like the one at the mouth of the Little Arkansas river and another at the mouth of Chisholm creek."

Mr. Mead does say that the islands have been growing and increasing in number, but his evidence shows that that increase has been going on from the time of his first acquaintance with the river, and did not begin during the period of irrigation in Colorado. (2131, 2134.)

Owen B. Stocker, of Wichita, is asked as to whether, after the flood of 1904, there was not a great public sentiment against the people who had been artificially narrowing the channel of the river, and he says:

"Well, I think there has been some talk through the papers here of having the city do something, or some one who had the authority, to stop these people from narrowing up the river." (2150.)

M. E. Morgan, of Wichita, speaks of the increase of the number of islands, but he describes "Dutch Joe's Island" as having been right in the river, right in the town there, twenty-nine years ago. It was then a regular island in the river, with a stream next to the main bank. Then he says:

"As to what caused that western portion of the river to fill up, the first time I noticed it in time of high water there was a lot of brush and trash came down and gathered at the north end of the channel and from that it kept filling in gradually. It would form a sandbar wherever brush caught in, and then the water running over washed the sand over and it filled in that way gradually." (2185.)

And speaking further of the filling along the banks of the river, he says:

"I will say it has been gradually filled in by the inhabitants for probably fifteen or sixteen years, by people building out into the river. I mean filled out, by driving piling etc., and filling it with manure and narrowing it up. * * * As the sand formed a bar up the shore they commenced driving piling along at the edge of this and filling in dirt and manure. When that was done the

next thing the sand would come up over that and they would then drive some piling or something to fill it out a little further. They kept filling in in that way as the river went from the bank and drawing it more into the channel and it kept filling in." (2185, 6.)

Frank Bridgeman, of Wichita, says:

"Yes, sir, I assisted a man to put in some stuff to fill along the banks, because I was hired to do it by the man that owned the land. His idea was to put a dike across there and a little brush on top of it, and when the June rises came that would fill in from six to eight inches, or whatever it might be, with that miry sediment. Before that time there were three islands there. * * * I lived there in 1889 and the people began to think about taking in that place and went to work at it, and it made lots of made land and it took several years to do that." (2192.)

On cross-examination this witness says:

"Yes, sir, I know of other islands than those I helped to attach to the mainland that farmers along the river have attached. There are several of them there, but I couldn't tell you exactly whose they are. Yes, sir, that is done pretty generally along the river from Mount Hope bridge to Bentley. Of course, when you fill up a channel and attach an island to the mainland, that

narrows the channel of the river, yes, sir." (2193.)

M. M. Murdock, of Wichita, already frequently cited, says:

> "At the time of building the new bridge I was conducting a paper and had a good deal to say as to the wisdom of building a bridge long enough to take care of the water at high-water times. I have been protesting against the filling of this river for a good many years. It has been my judgment, and I have said through the paper, that the shortening up of the bridge and the narrowing of the channel was injuring the city." (257.)

In reading these extracts from the evidence one would suppose that these witnesses must have been produced by the defendant, State of Colorado; but no, not one of them; they were all produced by the State of Kansas, and in a large measure this testimony which we have cited was elicited on examination-in-chief. This evidence coming from the complainant's witnesses is supplemented by like testimony coming from witnesses produced by the State of Colorado, of which the following may serve as an illustration:

E. E. Frizell, mayor of Larned, Kansas, and a land owner along the river, says:

> "As to whether farmers are anxious to have this made land grow and assist and

help it along, I would say my own experience has been to fill up the channels adjoining the river and cause the river to flow on the other side. In other words, I try to swell my acreage as much as I reasonably can by reason of the peculiar shifting character of the stream. Yes, sir, that is true. And I should say *that has been general up and down the river.* I have known of the channel being dammed to cause the water to flow on the other side, and I have known of trees being planted on the main land or added land." (1564.)

Certainly, in the light of such testimony, coming so largely from the complainant's witnesses, we do not, in addition to our argument heretofore presented, have occasion to go further into this subject. The irrigators of Colorado are not in the slightest degree responsible for the filling up of the bed of the Arkansas with islands, or for the accretions along its banks, or for any incidental results as to danger from flood that may have ensued. We may also say, however, that nowhere in this record is there found to have been any damage suffered by floods since irrigation commenced that is in excess in any degree of the damage from floods which occurred prior to the period of irrigation, as, for example, in the year 1877. (See Record, pages 254, 352.)

VI.

THE WESTERN KANSAS DITCHES HAVE NOT SUFFERED BY REASON OF IRRIGATION IN COLORADO.

The ditches in western Kansas, in the minds of counsel for Kansas, present a special subject for lamentation. It is in reference to them that the statement is made in complainant's brief:

> "As a direct and proximate result of the diversion of the waters of the Arkansas river in Colorado by the defendants * * * the irrigation ditches in western Kansas have been deprived of their water supply, of long prior appropriation, leaving them ruined, the lands deserted, and the resulting industries and prosperity almost extinguished." (Brief, 184-5.)

We have already, in Division I of this argument, called attention to the fact that four of the complainant's witnesses testifying at Garden City, and several citizens of Kansas produced as witnesses by the defendant, show that this picture of desolation does not truly exhibit existing conditions.

If, as we have shown, the waters of the Arkansas, when the river was in its natural state, were wont to sink into the sands in the neighborhood of Coolidge, so that at stages of low water the river bed would have no flow, but simply consist of dry sand, then it must be true that in dry seasons there would be no supply of water for ditches in Kansas except from occasional floods.

It is to such conditions that Professor Newell has reference when, in the passage already quoted, he says that under such conditions "presumably there would be very little effect from taking it [the water] out *entirely* in Colorado." (1266.)

1. The argument of Kansas, however, as to the relation of cause and effect has, if we may be permitted so to say, the same sort of vice that we have marked in other parts of the discussion. The argument, in substance, is that the ditches of western Kansas during the years 1881-1886 had an ample supply of water for irrigation; that the Colorado system of ditches was completed about 1891, and that by the year 1892 they diverted practically the total flow of the river, exclusive of flood periods; after 1893 the Kansas ditches could not furnish water to their customers; the ditch companies became bankrupt and the ditches fell into disuse, *therefore,* the destruction of the Kansas ditches and the bankruptcy of their owners is due to the diversion of water in Colorado. This is the sole argument, and it carries that well-recognized fallacy that has been known of all time, it relies wholly upon the relation of events as to time. (1) The Kansas ditches were good and amply supplied with water; (2) subsequently Colorado diverted the water of the river; (3) thereafter the Kansas ditches failed and became utterly worthless; therefore, the diversion of water in Colorado caused the destruction of the Kansas ditches. Is not this the entire argument?

It is not difficult, in the examination of this evidence, to find that the argument of Kansas is not well founded, and that there are other causes which very

clearly explain the misfortune of the ditches of western Kansas.

It is true that during the years 1881 to 1886 these ditches had a good supply of water; it is true that in the years 1893 and 1894 they did not have a good supply of water. It is true that thereafter the ditches were allowed to go into disuse, the dams to wash away, the ditches to fill up, and that the companies went into bankruptcy and receivers were appointed, and a large amount of money was lost.

But it is also true that, commencing in 1901, there was a revival of the ditches of western Kansas, and that from that time to the present they have been useful and productive enterprises, and western Kansas is now enjoying, and has been for four years last past, the advantages of an ample supply of water for its irrigating ditches.

We do not need, for the purposes of our argument, to trace the history of mismanagement of the western Kansas ditches in the years from 1894 to 1900, although there is much testimony upon the subject. A few references will suffice. See the evidence of Block (1455, 1460), Hogbin (1474), Stocks (1477, 1481-2), Weeks (1494).

It is sufficient to say that even though there was grossly bad management of these ditches, yet there was also a scarcity of water in 1893 and 1894, and the argument we have already made will show what had become of it. Those were dry years, and the water of the Arkansas, in its natural flow, in accordance with the ancient habit of the river, would sink into the sands of the channel before they could possibly reach the headgates of the Kansas ditches. Irriga-

tion in Colorado was then new, and the seepage and return waters had not yet begun to equalize the flow of the stream over the "sieve;" the Colorado canals had not yet been sufficiently developed to carry the water at a higher level for such a distance as to redeposit such waters at points east of the old point of disappearance in the channel, and the natural forces which had always operated in dry seasons in the Arkansas river were in the years 1893 and 1894 still operative.

Dodge City is in western Kansas, and not far removed from the Kansas irrigating ditches. The yearly weather record there must fairly represent weather conditions in the territory under discussion.

A great deal of instruction can be found in the study of Exhibit 17, showing for thirty years a record of the rainfall at Dodge City, and introduced into this record by the United States, intervenor. From that exhibit we have extracted certain figures, and from them made certain computations, which will be exhibited in the following table:

RAINFALL—DODGE CITY.

		Annual Normal Rainfall 19.84"		Four Months May, June, July, August Normal Rainfall 12.32"	
	Year	Actual	Ratio Actual to Normal	Actual	Ratio Actual to Normal
A.	1881	33.55	169%	22.01	178%
	1882	13.14	66%	9.49	77%
	1883	28.50	143%	17.99	146%
	1884	30.36	153%	23.36	189%
	1885	23.71	119%	13.92	113%
	1886	19.35	97%	10.40	84%
	6 Years	148.61	125%	97.17	131%
B.	1892	19.06	99%	11.92	97%
	1893	10.12	51%	7.21	58%
	1894	12.60	63%	5.95	43%
	3 Years	42.38	71%	25.08	68%
C.	1901	16.06	81%	6.90	56%
	1902	17.70	89%	11.19	91%
	1903	15.27	77%	7.17	58%
	3 Years	49.03	82%	25.26	69%

This table at once reveals to us the reasons for the prosperity and the decline of the Kansas ditches. Table A shows that for a series of years after those ditches were constructed, from 1881 down to 1886, inclusive, there was a good supply of water. Taken as a whole, they were very wet years, so much so that in the aggregate the yearly rainfall was 125 per cent. of the normal, and the rainfall for the months of May, June, July and August, which would be the only

months in which irrigation would be practically used for the growing crops, the aggregrate rainfall was 131 per cent. of the normal fall for the same period. On the contrary, for the years of their misfortunes we find from table B exactly the opposite condition, even including in the computation the year 1892. We find that these were dry years, all giving a rainfall less than the normal, and the years 1893 and 1894 being years of actual drought. And for the aggregate of three years we find that the yearly rainfall was only 71 per cent. of the normal yearly amount, and that for the four months named the rainfall was only 68 per cent. of the normal amount for such months.

In the light of the argument we have already presented as to the natural flow of the Arkansas river, we need only to suggest the patent facts that in wet years the river is liable to carry a continuous flow of water, although losing a great deal in the sands, and that such continuous flow of water would furnish a supply for ditches in western Kansas, but that as soon as the dry years come, under such natural conditions of the river, there would be an inevitable diminution of that supply at the headgates of such ditches.

2. But this table contains another feature of very especial significance in this argument. Table C is for the years 1901 to 1903. They also were dry years. Fully as dry in the irrigation months as the years from 1892 to 1894. In these later years the annual rainfall was in the aggregate only 82 per cent. of the normal amount, and for the four months already mentioned the aggregate rainfall was only 69 per cent. of the normal amount, and yet, during this latter period of drought, the Kansas ditches had suf-

ficient water. This fact is clearly shown by the testimony.

Henry Block, of Garden City, says:

"About three years ago a number of land owners under this ditch [the Alamo] acquired the equity that the people of Massachusetts had and put the ditch in better shape. Yes, I think I have had occasion during the last three or four years to notice the flow of water in the Arkansas river and the operation of this ditch I speak of. For the last two seasons they have irrigated land under that ditch, and this will make the third season they have been irrigating under the new ditch. Yes, sir, I know what has been done during this time under this ditch; and as to the water supplying the ditch, the flow of water in the Arkansas river at or near Syracuse during the last three years, has been very good, I would call it, for the Arkansas river. It was a greater flow during these years than during the years, say from 1891 to 1894, at any rate, when the Alamo ditch was in operation. There has been more water in the Arkansas river at Syracuse in the last three years than there was at that time. * * * I believe that there has been ample water flowing in the Arkansas river at the head of this Alamo ditch to supply that ditch during the irrigating season of the last three years, or what is ordinarily termed the dry season, and, in my judgment, there has been a constant stream flow-

ing in the channel of the river at that point during the last three years and during the dry season of the year." (1455.)

D. E. Hogbin, of Garden City, says:

"Yes, sir, there has been enough water in the Arkansas river during the irrigating season of the last three years to supply that lower ditch with water for irrigation, and the flow of the river at the headgate has been ample to supply it for that purpose. Yes, sir, I think the flow of the river during the last three years has been steadier and more uniform during the irrigating season than in the years preceding. Yes, I think there has been an increase in the flow during the irrigating season for three or four years, and there has been ample water flowing during that time to supply that ditch for irrigation." (1469-70.)

B. F. Stocks, of Garden City, says:

"I think it is in the main correct to say that the supply of water in the Farmers' ditch for the last two years has been entirely satisfactory. I so understand it. * * *

"No, none of the ditches about Garden City are using water at this time. As to their getting a full supply last year, the Garden City ditch last year furnished water to all demands, and for several weeks when there was water in the river didn't use it because they had no call for it." (1483.)

George W. Swink, of Rocky Ford, has recently invested in lands in western Kansas, and in ditches there, because of his belief that they will hereafter have sufficient water. (914, 917.)

W. M. Wiley, who has control of those Colorado ditches which are nearest to and which cross over the line of Kansas, makes the following statement:

> "Up to the year 1900 the ditches in Kansas were, to all intents and purposes, abandoned, and agriculture existed only in some of the river bottoms. Practically no effort was made to keep up even the temporary and insecure sand dams. Weeds were permitted to grow in the ditches; laterals were closed up, and the habit and thought of the people was that they could not operate their ditches successfully. About the year 1899 or 1900 a ditch, with its headgate a few hundred or a thousand feet west of the Kansas line in Colorado, began to take notice that the river was supplying a good head of water in such a constant stream as to make it available for irrigation purposes. While the headgate of this ditch is about a thousand feet in Colorado, the ditch is operated solely for the irrigation of Kansas lands; but it is the nearest ditch to Holly. They cleaned their ditch out and began the construction of sand dams. The land under that ditch now is very valuable, and a very large proportion of it is under intensive cultivation. Noticing the advance that had been made in agriculture under that

ditch, the other ditches began to be cleaned out and temporary sand dams put in the river for them. They found their supply of water constantly and rapidly increasing. The land around Lakin, Deerfield and Garden City have, since the year 1900, assumed the appearance in successful cultivation that the Colorado lands have around Rocky Ford and the more highly cultivated sections of the Arkansas valley. To put a measure on what they have accomplished, they grew, in the season of 1904, 500 acres of sugar beets, with such success that for the present year [1905] they are carrying an acreage of something over 2,000, and nearly all of their ditches are now in proper shape to sustain a highly cultivated crop, and those ditches that are not in that shape are so, not from a lack of water, but from the inertia of the owners in waking up to the situation. I will say of this acreage I have mentioned, Garden City has signed for twelve hundred." (1441-2.)

Referring to the actions and purposes of his own company, operating a large system of ditches near the state line, Mr. Wiley says:

"We certainly do intend to extend the Buffalo canal into Kansas again, and continue its operations down there. The best prospect for the development of agriculture that I have any knowledge of in this country to-day is in western Kansas, and the people

> have, within the last few years, waked up to the value of irrigation and the crops that can be grown by it, and we look for large profits from the operation of the canal in Kansas." (1448.)

Now, this increased flow of the river in western Kansas during a period of comparative drought, so far as regards rainfall, and this revival of western Kansas ditches, in full confidence of an ample water supply, furnishes the very strongest confirmation of the argument we have heretofore made. Here is an illustration in practice, involved in this very case, of the increase of flow, of the equalization of flow, and of the extension eastwardly of the surface flow, all resulting from the extensive system of irrigation that has been going on in eastern Colorado.

This situation in the vicinity of Garden City illustrates the absolute truth of Professor Elwood Mead's statement, quoted in reference to the return of seepage water to the channel of the stream, "It would just continue to travel on down." (1391.) (See, also, *supra*, pages 148-150.)

There is a great deal of evidence in this case derived from witnesses for the United States, as well as for Colorado, to the effect that the proper utilization of the waters of a stream for irrigation demands that these waters should be first diverted in the upper reaches of the stream; then the seepage and return waters aid all the ditches below, and the gradual extension of the saturated territory down the stream gives the beneficial results which we find illustrated now in the western Kansas ditches. This could not be the case if the first diversion, with the first right,

took place in the lower reaches of the stream. Especially is that true in a stream like the Arkansas, where the waters are lost in the sand if permitted to flow in the natural channel.

3. The methods of diversion and storage of the waters of the Arkansas in Colorado inure to the benefit of western Kansas.

Not only does the soil between the irrigating canals and the river furnish a practical reservoir for holding and gradually delivering seepage and return waters, but it is also true that reservoirs constructed for the purpose impound the flood and high waters of the river for use in times of low water. The record shows in detail the development of storage reservoirs along the Colorado Arkansas. See the evidence of the witnesses Chew (518-19, 520, 498), Beaman (731-2), Wiley (1429-30).

The bed of the Arkansas river in Colorado is, however, not utilized for purposes of storage reservoirs. The complainant's brief comments on the Fort Lyon dam at La Junta (Complainant's Exhibit No. 42), and a picture of this dam at low water is exhibited at page 135 of complainant's brief. The illustration used, and the argument derived therefrom, are to some extent misleading. The real character and purpose of the dams constructed across the Colorado Arkansas are explained by Professor Carpenter. He says:

> "I am familiar with the general character of the construction of the dams along the Arkansas river in Colorado, which are used for diverting water from the river into the

head works of the various ditches. They are all of the type that would be known as a diverting dam. Their purpose is simply to enable the canal to take water at the time when it is needed. It is not a storage dam, as is a reservoir dam. They are all of them overflow dams, or what some would term weirs; that is, the water runs over the top of the dam. It simply holds the water there to force it into the canal. It does not prevent the water from passing by. It raises the bed of the river possibly a few feet, and that is all. Take the Fort Lyon or Amity dam; they carry over their tops all excess of water, as in the case of the recent floods, which ran up into thousands of cubic feet per second. These dams run from three to seven or eight feet in height. When the river rises the surplus water simply proceeds on over the dam and down the river. Then in addition every canal in the state, almost, has a waste-gate. In regulating the intake into a canal the large amount of water which may be in the river renders it sometimes impossible, almost, to regulate it. There is a set of gates next to the river itself, and these can be raised or lowered so as to regulate the water to some extent, but they can not get just the exact amount of water at that place, and so below there is almost always placed a second set of gates, which are waste-gates for running back to the river the excess of water." (691-2.)

SHOWING PASSAGE OF WATER OVER DAM OF FORT LYON CANAL

An illustration of conditions at a good flow of water at the very dam exhibited in complainant's Exhibit No. 42 will be found in defendant's Exhibit No. 30 (1818), a reproduction of which is here inserted. This is the Fort Lyon dam, and the "highest dam on the river," and yet at good flow the water sweeps over the dam for its full length. The character and construction and size of the various dams used in the river for the diversion of water into canals is especially shown by the witness Chew, who gives full information concerning the Amity dam, the Fort Lyon dam, and many other dams along the river. (500, 501-2.)

Experts have reported, and the fact will appear at various places in the record, that the storage of water in Colorado is of the greatest advantage to western Kansas.

Major Powell, in the report made by him to the secretary of state for transmission to congress, as already cited, expressly says: "The prospects for irrigation in western Kansas depend on the storage of water in Colorado." (640.) He further says: "The future development of irrigation in the valley of the Arkansas, therefore, depends chiefly upon the storage of water. This storage can be accomplished with advantage, in fact with great economy, in the mountain regions of Colorado." (663.)

From the evidence already cited it will be found that many of the reservoirs described are situated in the mountainous part of the country bordering the river, and, wherever these reservoirs are constructed,

by the regulations as to the distribution and use of water, careful provision is made that such reservoirs shall be filled only when there is a surplus flow in the river. Mr. Chew says: "These reservoirs are not allowed to be filled at any time of the year, but only when there is a surplus of water for all decreed ditches." (518.) He also says: "They are filled when there is a surplus, practically then during the flood season, and when the water is above the normal stage of the river." (518.)

There are, however, certain extensive reservoirs which are situated comparatively near the Kansas line, the seepage from which will be in itself an immediate and direct benefit to western Kansas, and these reservoirs, as time advances, will be a valuable source of supply for the irrigation of western Kansas lands. These are what are known as the "Great Plains reservoirs," the southernmost edge of which is about twelve miles north of Lamar, and of these reservoirs Mr. Wiley says: "The examination we made for the purpose of finding the reservoir sites and improving our water supply was made with the sole purpose of getting the water down into Kansas for the irrigation of the Kansas land which belonged to our enterprise. We understood at that time that we had direct water from the Amity and Buffalo canals to irrigate all of our lands in Colorado." (1430.) The location of these reservoirs was the result of careful investigation of the whole situation, with a view of providing water for the irrigation of Kansas lands. Mr. Wiley says that he found that "we would have to build reservoir systems to store the flood water to irrigate the lands in Kansas, and at my instance surveying parties were sent out in every direction to

survey for a reservoir site. The most exhaustive examination that was made for reservoir sites was made in Kansas * * *. The reservoirs that were developed by us were the only feasible basins, taken from the different standpoints, which were found, or probably I had better say the most feasible basins." (1429-30.)

Mr. Wiley says:

> "We take no waters out of the river for the reservoirs during the irrigating season, except in times of big floods. We do not take it out for the reservoirs at any other time than the winter season and the seasons of flood during the remainder of the year. We never store any water in the reservoirs that can be used for irrigation by anybody on the river." (1439.)

Reason would say that it is a necessary consequence, and observation has proved it to be the fact, that this diversion and storage of water along the Arkansas river has the effect of increasing the water supply for the ditches in western Kansas. We find here additional explanation of the fact that the Kansas ditches, even in times of comparative drought, have now a good supply of water.

In view of the allegations of the amended bill, and its claim of riparian rights as against the right of appropriation of water for purposes of irrigation, the whole argument of the State of Kansas on the subject of the irrigation ditches in western Kansas seems to be inconsistent and forced. The contention does not lie within the range of this proceeding. The

appropriation of water in Kansas for the purpose of irrigation rests upon an entirely different principle from that which is invoked in the amended bill. It is, however, at present sufficient to say that the western Kansas ditches have not, in fact, been injured by irrigation in Colorado, and that, on the contrary, they have already been greatly benefited by the existence of Colorado irrigation, and the benefits which have already begun are sure to increase and extend down the Arkansas, and bring great prosperity to the people of that section.

VII.

THE DIVERSION AND USE OF THE WATERS OF THE COLORADO ARKANSAS HAVE NOT CAUSED ANY INJURY TO THE POWER PLANT AT ARKANSAS CITY.

It is a far cry from the state line of Colorado down the Arkansas, to the line of Oklahoma, where Arkansas City is situated. It would certainly require a very clear showing, and a logical deduction of effect from cause, to show that Colorado irrigation had injured a water power plant at Arkansas City.

When we examine the argument of Kansas, however, upon this subject, we at once meet the same old fallacy, which, we regret to say, has so thoroughly permeated that argument throughout. It is again the fallacy *post hoc, ergo propter hoc,* and no other factor than that of time is utilized to show the relation of cause and effect.

Mr. W. D. Johnson, a witness for the United States, as we have already quoted, has said that by

going so far eastward as *Wichita,* we would almost completely eliminate the Arkansas river of Colorado, which is one river by itself, from the Arkansas river of eastern Kansas, which has another source of supply. (1235.)

In this connection we might say that counsel for Kansas, in the early history of this case, were of the same opinion, for in discussing the effect of Kansas irrigation laws and of the diversion of waters in western Kansas as possibly affecting the lower reaches of the river, counsel then said:

> "It is also proper to call attention to the fact that there can be no dispute such as this between Kansas and Oklahoma, because the river passes through a humid region *before it reaches Oklahoma,* and is re-enforced by the Little Arkansas river, the Ninnescah river, the Walnut river and many minor streams."
>
> (Complainant's brief of Jan. 23, 1902, page 117).

We fully agree with counsel in this statement, but it follows *a fortiori,* and as shown by the argument we have heretofore made, that no diversion of water in *Colorado* could possibly be the cause of diminishing the supply of water at a power plant at Arkansas City.

But, even the argument of *time* relied upon by Kansas on this subject, is not in accordance with the facts. Counsel say (Brief, 106):

> "About the year 1890 the water in the river began to fail, and the flow of the river was not more than one-half as large as formerly (389); the water power in the canal also began to fail, and the canal company could not furnish water power to the factories."

Now, the selection of the year 1890 for this argument rests upon the testimony of one W. M. Sleeth, manager of the power plant and allied establishments at Arkansas City. This witness, testifying in August, 1904, uses this language, which is the basis for counsel's reference:

> "It has been within the *last ten* years, I would say, that we began to notice the lessening in flow of the river and consequent decrease of power in the plants. This was somewhere about 1890. I should judge the flow of the river to be about one-half as large as formerly, *though I am not certain, I couldn't tell.*" (389.)

Now, the further testimony of Mr. Sleeth, on cross-examination, has the effect of changing this date, and at the same time of giving a complete answer to the whole contention on the part of Kansas upon this subject. Other witnesses had spoken of the original construction of the water power canal in 1881, but it seems that in 1885 it was so radically improved and enlarged that Mr. Sleeth speaks of that as the date of construction, and he also tells us that afterwards, in 1887, they moved the intake of the canal farther

up stream. Now, having given us this information, he then says:

> "After we constructed the canal in 1885 these various institutions of which I have spoken commenced to take power. They didn't all come in at once. There were two large flouring mills and then the wind engine factory, and then the chair factory, and then the two large flouring mills were merged or consolidated into one. We reached the maximum of power-using institutions in about ten or twelve years, I should judge, after the canal was constructed. *It was about 1894 or 1895* that we got the maximum. *We had plenty of power for all these up to that time.* It was after that time that the power began to get short." (389, 390.)

We find, then, that for five years after the practical completion of the irrigation system in Colorado, according to the date fixed for such completion by the Kansas brief, and for seven years after such completion, if we take the date given in the sixth and eighth paragraphs of "the summary of facts proved," set forth on page 184 of the Kansas brief, the power plant at Arkansas City had plenty of power and was furnishing, and had continuously up to that time furnished, all the power that its customers could use.

Outside of the mountains and away from Niagara, there is hardly a water power plant between the two oceans that has not in recent years found it necessary to supplement its water power by steam power. We take the liberty of calling Mr. Justice Brewer as a

witness, to show that a like experience was to be anticipated in Kansas. As long ago as 1871 he had occasion to remark: "Here with us in Kansas, owing to the physical conformation of the state and the general use of steam as a motive power, the comparative value of water power secured by mill dams will probably always be slight." (Vernard vs. Cross, 8 Kansas, 248, 261.) The experience of the Arkansas City Water Power Company is not unique.

But the witnesses produced by the complainant clearly show the existence of other causes than lack of water for the inefficiency of this water power plant. Ice in the winter and flood in the summer have also caused it to shut down. Its canal gets its power by the fact that its intake on the Arkansas river is higher than its outlet in the Walnut river. The power canal cuts across the neck of land which separates the two above the junction of these streams.

But, Mr. Sleeth says:

> "When the Walnut river is high it very much diminishes the effectiveness of the canal for power purposes. It shortens the head, and that is apt to occur during the spring or summer months. It sometimes exists for a day or two at a time, but not for weeks at a time. I don't think it ever, to my recollection, existed for a week *at a time*. It has existed to such an extent as to affect the lighting of the city, and we think that, to be assured of light at all times, it is necessary to supplement this water power with steam, and that is what we are doing, and the same

is true of those other institutions that have supplemented the water power with steam." (390.)

But it would seem that the power plant at Arkansas City is still enjoying a fair degree of prosperity. A large flouring mill was for a while supplementing the water power by steam, and an unfortunate fire burned down the mill. They have rebuilt the mill, and "they haven't put this steam power in since, although the mill has been rebuilt, and they are again relying on the water power. The electric plant relies wholly on the water power." (Sleeth, 390.)

Mr. Sleeth, in another place, tells us:

"We have leased to the Arkansas Milling Company 300-horsepower, and then we have the electric light company, about 150-horsepower. I couldn't say what is the limit of the canal's horsepower production. It has 22 feet fall or drop as the maximum. It wastes over after that. The wind mill company is taking power from the canal now. Those are all the companies that are taking power from the canal now. We have found by experience that that is ordinarily all the power that the ditch or canal will develop. I don't know that any of the other institutions along the canal have stopped using water power from it except the chair factory; it has stopped using water power, *but not for the reason that they could not furnish it.*" (415.)

In view of this evidence from the manager of the water power plant, which is sustained in large part by other witnesses who testify upon the subject, and is contradicted by none, we submit that it is unnecessary to pursue this subject further. In any event, the alleged grievance, independent of any consideration as to its cause, is utterly trivial in its character, and concerning it we need only quote the ancient maxim of the law, *de minimis non curat lex.*

VIII.

IRRIGATION IN COLORADO HAS NOT DIMINISHED THE NAVIGABILITY OF THE ARKANSAS RIVER IN KANSAS.

Navigation of the Arkansas river in Kansas! The deference we owe to the distinguished counsel for the State of Kansas, and the high respect which we entertain for them, necessarily compel a suppression of some of our views as to their contention upon this subject. We must assume that in a case of such serious gravity as this any distinct subject or contention is presented seriously and in good faith.

Of course, Kansas can not in this action complain as to any alleged diminution of navigability of the river, if such navigability never extended up the river far enough to be available to the people of that state.

In this case the United States, as intervenor, alleges in its petition of intervention "that said stream is not navigable in the States of Colorado and Kansas, and the Territory of Oklahoma, but is navigable in the State of Arkansas and in the Indian Territory." (235.)

This subject was fully covered by witnesses produced by the United States upon this hearing.

William L. Sibert is a major of the Corps of Engineers in the United States army, and was stationed at Little Rock, Arkansas, from 1894 to 1898, in charge of the Little Rock district, and Major Sibert informs us that during his stay there, even small boats did not go up the river farther than Fort Gibson, if they went that far.* (1295.) That when the river was at a low stage there was no practical navigation on the Arkansas river above the city of Fort Smith. That, ordinarily, the head of navigation was considered to be Fort Gibson. (1286.) He says:

> "Insofar as I know, the conditions now as to the river being navigable above Fort Gibson are as they were at the time mentioned in my previous answer." (1296.)

Mr. Sibert says on cross-examination that there was no considerable navigation as far up as Fort Gibson (1297.) He also says:

> "From my investigation and reading of historical records and from observations there my conclusion was that the low water stage is no less now than it was prior to the time when they began to irrigate the lands in Colorado from the waters of the Arkansas river." (1298.)

L. P. Drake, of Little Rock, Arkansas, has been boating on the Arkansas river for about thirty years.

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*Fort Gibson is in Indian Territory, more than 125 miles down the river from the southern boundary of Kansas.

He says that he does not think there is any less water in the Arkansas river at the present time than there was years ago when he first began boating; that the volume of water is about the same. (1298.)

Very similar testimony may be found from other witnesses introduced by the intervenor at Little Rock. See the testimony of Edwin Huston (1300); David E. Chapman (1304) and P. R. Van Frank, Jr. (1309).

When we come to consider the argument set forth in the Kansas brief, that argument may be concentrated, and, so far as concerns the relation of cause and effect, may be expressed by three quotations:

> "In early years by all parties, and especially by the United States government, the Arkansas river was considered practically navigable as far up as the city of Wichita." (Brief, 20.)
>
> "But it is also a fact that *after the diversion of waters,* hereafter to be described, the Arkansas river has not been considered navigable further than Fort Gibson." (Brief, 23.)
>
> "As a direct and proximate result of the diversion of the waters of the Arkansas river in Colorado by the defendants, the navigability of the river above Fort Gibson has been destroyed." (Brief, 184.)

Here is the entire argument as to cause and effect presented by Kansas. All else serves only to support the first and second propositions. The argument, as thus expressed, "speaks for itself." We submit that the conclusion is a *non sequitur.*

Counsel in their brief also, however, make this remarkable statement:

> "Whether the river was, or ever could have been made, practically navigable between Arkansas City and Wichita, *is not a fact to be determined in this case.*" (Brief, 22.)

We would ask, then, why is this subject brought into this controversy? It is brought in by Kansas, not by Colorado. It is apparent that this contention is relied upon as furnishing an affirmative ground for relief in this action. Then, how is its effect to be considered without first knowing as to the fact of navigability or non-navigability? If the Arkansas river was never in fact practically navigable between Arkansas City and Wichita, then, certainly, Kansas has no ground of complaint on this subject against the defendants. If the river was practically navigable between Arkansas City and Wichita before the period of Colorado irrigation, then the question arises as to whether irrigation caused or did not cause a diminution of navigability. Clearly, then, the very first question to ascertain is, Was the river ever "practically navigable" in Kansas? The complainant practically admits that it was not. The whole tenor of the argument of Kansas upon this subject suggests that its counsel are fully in accord with the witness J. R. Sites, of Wichita, who says:

> "It never was navigable, *only in theory,* for *flat-boats.*" (1715.)

Out of deference to this contention presented by Kansas, and assuming that it is seriously presented, we should, perhaps, refer to the evidence of some of the complainant's witnesses, to see the character of navigation referred to.

Mr. M. M. Murdock, of Wichita, the first and leading witness for the complainant, says:

> "No boat ever got back that went down. They didn't go down with that idea. The river was not navigable for any practical purpose after you folks commenced taking the water, and before that it was not, in my honest judgment, navigable for any practical purpose. Grant once said when he was lieutenant in the army, that the Arkansas river would be navigable from this city to its mouth if they would copper-line it, and I guess he was about right, because I know how shifting those sands are." (261.)

R. E. Lawrence, of Wichita, says:

> "There was a flat-boat built here loaded with wheat and taken down the river, I think clear to New Orleans. It might have been about 1880." (333.)

This witness, however, a few minutes afterwards said:

> "I don't think that boat loaded with wheat ever got back. I haven't heard that whistle since, nor any, in the last twelve or

fifteen years. I don't know of any large boats that came back. Of course, small boats would *row* back. They only furnished transportation *one way*. * * * I don't say that the Arkansas river at this point is a navigable stream for commercial purposes. I don't think it was ever practicable to navigate the river at this point. We did hope at one time that by dredging the river that possibly it might be in certain seasons of the year, as far as Wichita. It was dredged by the government, but no navigation took place after that. The dredging boat itself came up, and that was all. With all our efforts we didn't get navigation; we didn't have water enough. * * * Before the government got through with dredging it out the water was gone." (333.)

P. H. Franey, of Arkansas City, called by the complainant, says:

"I never saw but one steamboat, that which I saw up there by Gueda, coming down the river, around here. I never saw that boat come back." (370.)

I. H. Bonsall, of Arkansas City, offered a prize in 1878 for any boat that would come up from Little Rock under her own steam. He says he had a scheme on hand to try to make the Arkansas navigable, and that an appropriation was gotten entirely by him through letters to Ingalls, Ryan and Plumb, the Ryan referred to being Mr. Ryan, now assistant secretary

of the interior, but who was then a member of congress from the Arkansas City district. Mr. Bonsall wrote an article showing the success that had been made in navigating the upper Arkansas, and tells of a small flat-boat, built at Arkansas City, loaded with flour and started down the river bound for Little Rock. The trip was made, the produce disposed of, but the navigators "returned *overland* to Arkansas City." (384.) This same witness says of the "Cherokee," built at Arkansas City and sent down the river with a load of wheat, "She didn't come back." (386.) The boat which came up the river from Little Rock was the "Aunt Sally." Her experiences are given in the testimony of Mr. Bonsall (383), and more particularly in that of David D. Chapman, of Little Rock, who was the captain of the boat on that trip. (1304.) It seems that the boat never went above the mouth of the Walnut river, where it had the additional waters and the deeper waters of that perennial stream. Captain Chapman says of his return trip:

> "We had no load coming down. The reason was the river was falling very fast and I knew enough about the Arkansas river to know that if I didn't get out then I wouldn't get out, and I had my boat up there and wanted to get away. We were offered to have a load given us if we would carry it out, but I didn't want it; I wouldn't take it." (1306.)

Captain Chapman was a boatman on the river for forty years, and he says:

"Fort Gibson was considered the head of navigation when I first began to ply the river. I would not consider the river navigable above Fort Gibson." (1304.)

But Kansas gravely urges that the Arkansas is a "meandered" stream, and therefore navigable in the eyes of the law. As above suggested, we are considering, in this case, the question as to whether the facts set forth and proved give a ground of relief as against the State of Colorado and its associated defendants. Some deputy surveyor, acting under the General Land Office, elects to meander this stream, instead of running his survey lines across it. Does this circumstance change the actual physical facts as to practical navigability? Counsel certainly would not so contend, and yet surely in this case we have to deal with the substance of things, not with shadows; we are dealing with realities, not with fictions.

If, however, we assume that which is not in fact true, that the Arkansas river was at some time, prior to 1890, practically navigable in Kansas, what shall we say as to the causes which have prevented continued navigation in that state?

There is a dam across the river at Oxford. There are numerous bridges across the Arkansas south of Wichita. (E. g. See Colo. Ex., No. 1, *supra*, page 156.)

It must be borne in mind that Arkansas City is practically on the southern boundary of Kansas. It seems from the evidence of the witnesses who described the water power canal at Arkansas City, that for the purpose of diverting the water into the canal,

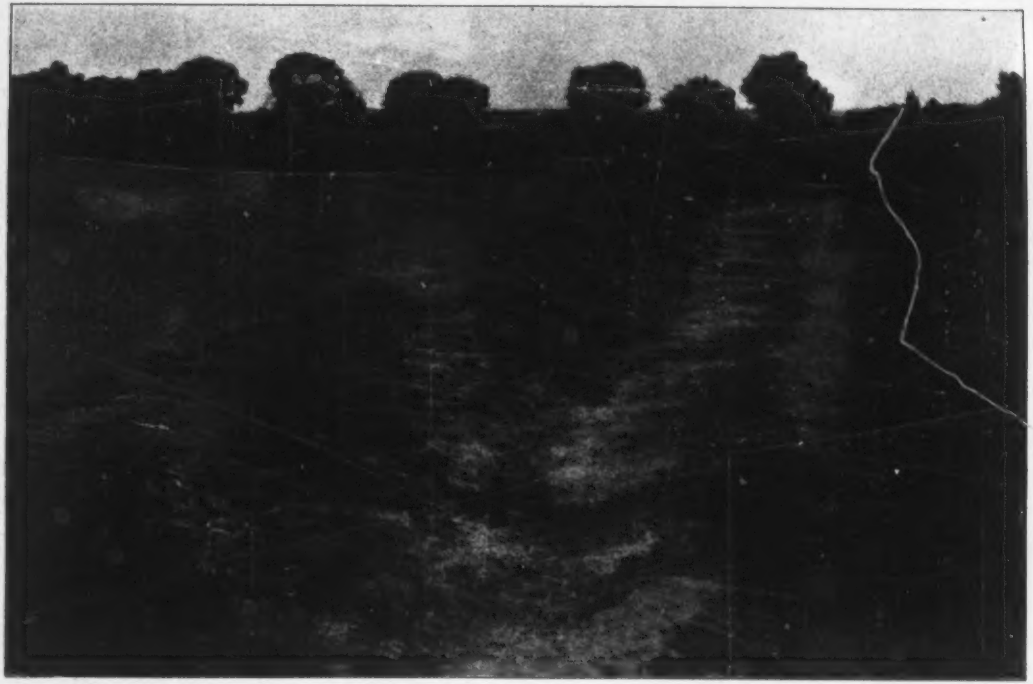
a dam was built across the Arkansas river (372, 389, 415). The defendant, State of Colorado, has caused a photograph to be taken of the conditions where this dam crosses the river, and Frank J. Hess, a witness for Kansas, on examining this picture, says that it shows that it is high water. (415.) A reproduction of that photograph is here inserted. From this picture we have an ocular demonstration of the fact that no boat could pass up the river, or, without practical destruction, pass down the river over this dam, even at a time of high water. Are the Colorado irrigators responsible for this dam? It was constructed, according to the evidence, not later than 1887. It was constructed by the sons of Kansas—Kansas that sues in its capacity of *parens patriae*—and yet Kansas, practically at its southern boundary, where the river runs off into Oklahoma and on towards the sea, builds a stone wall shutting out all access by boats from below, even at times of high water. And yet, under conditions such as these, Kansas comes before this court and with apparent gravity asks this court to conclude that irrigation in Colorado, four hundred miles away (620), has interfered with navigation at the place where this dam is constructed, although the dam existed before the irrigation commenced.

We here drop this subject.

IX.

IRRIGATION IN COLORADO HAS NOT DIMINISHED THE REVENUES OF THE STATE OF KANSAS.

It would seem as if the contention of Kansas upon this subject is sufficiently answered by the pre-



WATER POWER DAM AT ARKANSAS CITY

ceding argument, but in view of the prominence given to it in the complainant's brief we are, perhaps, justified in giving some phases of the contention further consideration. An analysis of section 32 of the Kansas brief shows that this alleged diminution in the revenues of the state of Kansas is based upon the following propositions:

(1) That the values of lands, including school lands (being the sections severally numbered 16 or 36), have been reduced, with a resultant reduction of revenues.

(2) Specifically, that the state "has been deprived of a large revenue from its own lands located at Dodge City and Hutchinson." [Soldiers' Home and Reformatory lands.]

(3) That the revenues have been diminished by reason of the lower assessed value of lands, as illustrated by fifteen quarter sections in Finney county. (Pl. Br., 156, 239.)

(4) That the revenue derived from personal property has been lessened as a result of diminished crop products, and especially the diminished acreage of alfalfa, as illustrated in Edwards county.

The first and second of these propositions have been amply covered by our discussion of the values of lands and crops, in treating of Kansas prosperity in Division I of this argument; and the relation of cause and effect has been fully considered in Divisions II, III and IV of this discussion. The remaining points have been touched upon, but concerning them we invite the further consideration of the court to the following suggestions:

1. Finney county assessment roll.

The complainant introduced its evidence upon this subject in rebuttal, leaving no opportunity for counter evidence as to the specific facts to be introduced in behalf of the defendant. Now, the effect of the argument is to show that the assessed valuations of the year 1889 on these fifteen quarter sections of land were very greatly reduced in 1897 and in 1903, and the Kansas brief says that the loss in revenue to the state of Kansas on these fifteen quarter sections of land in Finney county alone would be $24,775.00 a year.

Counsel make substantially a mathematical deduction, as follows:

> "There are 2,400 acres in these fifteen quarter sections, and there are about 235,000 acres under ditch in the five western counties, and perhaps about 100,000 acres had been actually irrigated. IF other lands in the Arkansas valley have decreased in the same proportions as the ones referred to, the loss to the state of Kansas in revenues derived from taxation in the five counties of Hamilton, Kearny, Finney, Gray and Ford alone would amount to many thousands of dollars each year."
>
> (Pl. Br., 239-40.)

From about one per cent. of the aggregate, and this one per cent. selected by the complainant, with no opportunity of contradiction, an inference is made as to the remaining ninety-nine per cent., and then the assumption is made that this reduction in the

assessed value of lands is due to irrigation in Colorado.

We have already called attention to the wet years in western Kansas from 1881 to 1886. Now, the evidence clearly shows that at this period there was a "boom time" in Finney county and in that general section of the State of Kansas. People believed that the country could permanently depend upon rainfall. Lands were taken up, crops put in, and values were soaring. The cycle of wet years, however, passed; the cycle of dry years came, with the natural consequences. Indeed, a witness introduced by the State of Kansas on the presentation of its original case tells the whole story, and reveals a succession of dry and wet years, with a corresponding movement of population in and out.

F. L. Pierce, of Garden City, speaking of Kearney county, says:

> "Fifteen years ago every quarter section of that county on the north side of the river was taken up by settlers. They broke up small pieces and went in with good heart to raise crops. They were not successful and abandoned the country. They couldn't raise crops because of the small amount of rainfall." (545.)

The witness further says:

> "After those first people settled some fifteen years ago the land returned to its wild condition. I saw that country settled

> and depopulated three different times. In 1879 the whole country about Lakin was taken up, and they went away in 1880 and 1882 and 1883. In 1886 the settlers again came in there and made another effort, and were driven out by dry weather. In 1889 again settlers came north of the river. In 1887 the two crops of settlers that had been here before had practically gone out. Again, in 1889 and 1890, they all left, with the exception of a very few." (545.)

There is other evidence in this record of like character, and it is very apparent that the fluctuations in the assessed value of lands in the five counties referred to in later, as compared with earlier, years arises from the fact that at the earlier period it was believed that they could permanently rely upon adequate rainfall and raise good crops. Experience proved the contrary, lands were abandoned and returned to their wild state, and their assessed value was, of course, reduced accordingly. This experience was intensified by the general demoralization, which resulted from the financial panic of 1893. But in western Kansas, as we have already shown from the testimony of the very witness who produced these statistics, lands are now rapidly rising in value, and this rise is justly attributable, in view of the argument heretofore made, to the present possibilities of irrigation, resulting from the development of the irrigation systems farther up the river, to wit, in Colorado.

2. Edwards county crops.

But the Kansas brief insists upon a loss in revenues because of the diminished acreage in crops, as illustrated in Edwards county. The argument is based upon a table produced in evidence by the complainant, and shown at page 440 of the record. It will be of profit to turn to that table and consider it in the light of complainant's argument, as to the reduction of the revenues of the State of Kansas. Counsel say:

> "The loss in acreage of alfalfa in Edwards county, as shown by the records introduced, between the years 1898 and 1904, was 4,146 acres. The State of Kansas has a direct and indirect interest in all the crops grown within its limits."
>
> (Pl. Br., 240.)

Now, this fact is cited by counsel in support of a contention that irrigation in Colorado has produced the effects in Kansas so resulting in a diminution of revenue. But counsel say on page 184 of their brief that the present system of irrigation in Colorado was practically completed in 1888. In another place (page 111) they say that the Colorado system of ditches was completed down to the state line in 1891, and that by the year 1892 practically the total flow of the river was diverted, appropriated and used in Colorado. Now, from the table to which counsel refers, at page 440, we find that in 1892, when, according to their contention, Colorado had completed the diversion of the entire river, the acreage of alfalfa

in Edwards county was only 451; that it rapidly grew thereafter for the ensuing six years, until in 1898, the date mentioned by counsel, it amounted to 6,923 acres. It would appear, then, that the irrigation canals of Colorado had been having their full effect for at least six years, and according to one contention, ten years, and yet during that time this tremendous growth of acreage in alfalfa took place. If Colorado irrigation is responsible for a diminution in this acreage between 1898 and 1904, may it not have credit, also, for the increase in this acreage from 1892 to 1898? The same causes were operative all the while. If the alleged cause ever existed it existed in greater degree in the first six years than in the last six years, for various witnesses for Kansas have already told us that for the last several years the flow of the river has been unusually good. In view of this situation, what value can we ascribe to the argument made by Kansas upon this subject?

But this is not all. Alfalfa is, of course, cited as a typical instance of a diminution of crop acreage, for the proposition to which it is cited is that the revenues of the state have been diminished. Now, we may suggest to counsel that they didn't make the alfalfa argument as strong as they might. By some accident of arithmetic or of the printer, they have understated the amount of diminution in alfalfa acreage in Edwards county between 1898 and 1904. That diminution should be a thousand acres more. Taking the argument, however, in its strongest form, let us examine the following table of comparison between 1898 and 1904, derived from these statistics given at page 440 of the record:

ACREAGE IN CROPS—EDWARDS COUNTY, KANSAS.

	1898.	1904.	De-crease.	In-crease.
Alfalfa	6,923	1,777	5,146	
Wheat	47,916	130,165		82,249
Corn	18,747	23,396		4,649
Oats	5,427	5,311	116	
Total	79,013	160,649	5,262	86,898
Net increase				81,636

Now, here we have a very remarkable showing. If the revenues of Kansas, derived from the lands of Finney county, decreased between 1898 and 1904, by reason of a less acreage in alfalfa, what shall we say as to the effect on those revenues of the *increased* acreage in wheat? What shall we say as to the *increased* acreage in corn? The alfalfa acreage did diminish by 5,146 acres, but during the same period the wheat acreage increased 82,249 acres; the net increase of crop acreage for the four crops of alfalfa, wheat, corn and oats between those two years was 81,636 acres. In other words, the acreage under crop in those counties more than doubled in the period from 1898 to 1904. What becomes, then, of the argument that the revenues of the State of Kansas have been diminished by reason of the diminution in crops in Edwards county between these two years? It is difficult to reconcile the presentation of such an argument as is here presented by Kansas with that good faith which should characterize the presentation of any case, and especially one of this importance. We shall look with

interest to the reply brief to see what explanation or justification can be made of this very remarkable illustration from Edwards county.

X.

THE RIGHT TO APPROPRIATE WATER FROM STREAMS, AND USE SUCH WATER FOR IRRIGATION OF LANDS, IS ESSENTIAL TO THE PROSPERITY, AND EVEN THE EXISTENCE, OF THE INHABITANTS OF NEARLY ONE-HALF OF THE UNITED STATES.

Nearly one-half of the total area of the United States lies within what may be called the arid region, a region in which irrigation is necessary for the successful production of crops. (Carpenter, 658.) Speaking in general terms, it comprises all that territory extending from a varying line, somewhere between the 97th and 100th meridians, on the east to the humid lands on the Pacific Coast. There are portions of the country east of the 97th meridian that are semi-arid; that is to say, that during many seasons do not have an adequate water supply for the growing of crops without irrigation, and on the other hand, there are scattered throughout the arid region isolated areas where crops may be successfully grown from year to year without irrigation. (Mead, 1387.)

There are ten million acres of irrigated land in the arid region, and there are now invested in irrigation works approximately two hundred million dollars. The population supported by the irrigated land amounts to many millions. (Mead, 1387.) Irrigation not only supports the people who live near the streams,

but these irrigated lands furnish the foundation for the prosperity of the entire arid territory, and even the cities and towns could not exist without this foundation. In fact in this vast territory the ability to use streams in irrigation is an absolute requisite to the existence of any considerable degree of civilized life. (Mead, 1366.)

Mr. F. H Newell, chief engineer of the Reclamation Service of the Geological Survey, says:

> "I think I have visited nearly every county in every state and territory of the arid region. The arid region is that region where the rainfall is less than twenty inches per year, but it is better defined as the region where the ordinary commercial crops, as we know them, can not be produced habitually without the artificial application of water. As such it would extend from about the 102d [?] meridian in Kansas westward to the Pacific Coast, excepting the wet area of western Oregon and Washington. Up to the present time, as shown by the census investigation, there have been irrigated upward of ten million acres within the arid region, and a population of approximately three million persons is dependent upon them. It is probable that by the complete storage of all the flood waters, by pumping water from underground and by the most thorough application of water to the soil, upwards of fifty or sixty million acres may ultimately be reclaimed, and if that is done within the next genera-

tion or century, it will probably result in a population of one person to two acres irrigated, or one person to one acre irrigated, or, roughly, fifty millions of people may be supported in addition to the number now within the arid region. This land, in its present condition, is almost valueless. It has a nominal price of $1.25 an acre as a rule, and much of it is not worth that. Under intensive cultivation and thorough irrigation, with an added population, such as we may expect, the land should rise in value to upwards of $100 per acre, and under favorable climatic conditions it may rise to several hundred dollars an acre; that is, under the best conditions with moderate temperatures." (1267.)

Professor Elwood Mead, chief of irrigation and drainage investigation of the office of experiment stations of the United States Department of Agriculture, says that by the proper storage and economic use of water between sixty and one hundred millions of acres of land can be added to the present irrigated area. (1387.)

Mr George H Maxwell, an expert introduced by the intervenor in this case, gives it as his opinion that within fifty years a total of one hundred and fifty millions of acres can be reclaimed. This last witness further says that this land in its present condition is worth very little, perhaps $1.25 an acre, some of it less; that if reclaimed by irrigation the land will be worth from $50.00 to $500.00 an acre, and that when properly cultivated this land will support at

least one person per irrigated acre; that is to say, that one hundred and fifty millions of acres will support, directly and indirectly, one hundred and fifty millions of people. (1165.)

In speaking further upon this subject, Professor Mead says that irrigation in the arid region is absolutely vital to its growth and development and absolutely necessary to any creation of wealth in lands or to the support of any considerable number of people. (1409.) Irrigation alone makes possible the development of other industries, by reason of furnishing the means of subsistence for those engaged in such other industries. Irrigation is also necessary in the border land between the arid and humid countries. There is a large area of country lying between that which is truly arid and that which is truly humid which will support but a sparse population, unless the amount of water which falls upon the soil should be reinforced by the use of the waters of the streams. (1409.)

Professor Mead further says that his experience and observation in the arid region of the United States lead him to confirm the results predicted by President Roosevelt from the reclamation of arid lands by irrigation, as stated in the following passage from a public message to congress, to wit:

> "The reclamation and settlement of arid lands will enrich every portion of our country, just as the settlement of the Ohio and Mississippi valleys brought prosperity to the Atlantic states. The increased demand for

manufactured articles will stimulate industrial production, while wider home markets and the trade with Asia will consume the larger food supplies and effectually prevent western competition with eastern agriculture. Indeed, the product of irrigation will be consumed chiefly in upbuilding local centers of mining and other industries which would otherwise not come into existence at all. Our people as a whole will profit, for successful home making is but another name for the upbuilding of the *United States.*" (1411.)

The evidence in this case shows that the inevitable tendency of irrigation is to distribute the lands among a larger number of people, because it takes a larger amount of capital per acre for the ordinary farmer to start agricultural operations in the irrigated country, and his operations are, therefore, restricted to a smaller acreage. Again, it is found from experience that with proper skill it is more profitable to confine operations to such products as require a high degree of skill and intelligence in raising and that bring higher prices in the markets. This results in intensive farming, such as is practiced in the irrigated countries abroad.

In an irrigated country, under favorable conditions, forty acres of land are sufficient, not only to support a family of five, but sufficient to enable the farmer to lay by a competency for his declining years. In many instances the value of the crops raised amount to the sum of $500.00 per acre, and in exceptional instances, to more than $1,000.00 per acre.

(Henry, 708-9; Carpenter, 658; Twitchell, 1098; Reid, 1114.)

From the remotest time irrigation has been found absolutely indispensable to the support of any considerable population in the arid regions of this country. The past history of this vast territory, comprising, as it does, more than two-fifths of the entire area of the United States, can be gathered from the remnants of irrigation reservoirs and canals—indestructible records of a prehistoric race, which may be found in many parts of the states of Colorado and Utah, and the territories of Arizona and New Mexico. (Carpenter, 1835.)

How extensive the entire system of this prehistoric irrigation was in the Salt River valley of Arizona alone, may be gathered from the fact that the amount of land covered by canals was over one-quarter of a million acres. The canals themselves, with their principal laterals, exceeded 1,000 miles in length. One of these acequias, now know as the Mesa canal, is taken from the south side of the Salt river about twenty-five miles east of Phoenix, Arizona, and after leaving the river runs for several miles through a formation of hard, volcanic rock. So far as known, without explosives of any kind, and with the simple tools of the stone age, the aboriginal constructors of this ditch excavated through the rock to a depth in places ranging from twenty to thirty feet. (Carpenter, 1836.)

In the thirteenth report of the United States Bureau of Ethnology, Cosmos Mindeleff describes some of these prehistoric irrigation ditches at length. On page 259 he speaks of the immense number of

ruins, and estimates the population as high as 500,000 people. (Carpenter, 1836.)

In the laying out and construction of some of these prehistoric ditches, a degree of skill was exercised which has not been surpassed by modern engineering. (Code, 1320; Carpenter, 1836.)

The evidence in this case, coming from the lips of trained scientific observers, shows that whatever civilized life exists in the arid region, with a few isolated exceptions, is dependent for its very existence upon irrigation. Deprived of the right to use water in the raising of crops, the people of this vast territory would be driven out, and the country itself would lapse into its original state of barrenness. (655, 660, 840, 907, 922, 951, 955, 975, 1023, 1098, 1121, 1164, 1197, 1206, 1377, 1893.)

Referring to some of the individual states and territories in the arid region, we find that in Arizona one canal system alone, the "Consolidated," irrigates 75,000 acres of land. (Code, 1315.) Governor Brodie of that territory gives the irrigated area of the territory as 350,000 acres, the average value of these lands being from $20.00 to $50.00 per acre, the settlement of the country being absolutely dependent upon irrigation. (Brodie, 1259, 1260.) Among the crops raised are oranges, dates, peaches, apricots, pears and plums. (Brodie, 1262.)

In many parts of the state of California irrigation is absolutely necessary to the growing of crops. (1164, 1176, 1206.) In that state about 1,500,000 acres have been reclaimed by means of irrigation and some of this land probably reaches the highest value of any agricultural land in the United States, rising

to $1,500.00 per acre, the average value being given as about $90.00 per acre. (1176.) Under irrigation in California, practically all the fruits of the temperate and tropical zones are raised. In the San Joaquin valley, in California, the effect of irrigation is very striking. It appears from the evidence that lands which were considered as a hopeless desert by the early settlers have been transformed into farms of wonderful productiveness. Communities have been built up which are as prosperous as any in the world, and land formerly worth nothing is now valued at from $50.00 to as high as $600.00 per acre. (Maxwell, 1164-5.)

In Idaho much has been done to reclaim the arid lands of the state, about 1,000,000 acres being now under irrigation. Two-thirds of the assessed valuation of the state is said to be produced by irrigation, and lands under irrigation are worth from $25.00 to $1,000.00 per acre. (Dubois, 1190.)

In Montana great irrigation projects have been completed and 1,000,000 acres reclaimed, which are now assessed at $40,000,000. Congressman Dixon of that state says that half the present and all of the future development of the state is dependent upon irrigation. (Dixon, 1197.)

In Nebraska, acording to the census of 1900, 148,538 acres were under irrigation, at the time the statistics were compiled, raising crops in 1900 to the value of $982,615.00.

In New Mexico, irrigation has been practiced for at least 200 years. (Perea, 1105; Rodey, 1157.) Governor Otero of that territory estimates that two-thirds of the assessed valuation of the territory has been

created by irrigation. About 1,500,000 acres are now irrigated. (Otero, 1077; Catron, 1092.)

In the Pecos valley, in New Mexico, a wonderful change has been effected in the past few years as a result of the construction of a great irrigation system. From a barren, treeless waste the country has been changed to a rich and fertile region, with irrigation works sufficient to irrigate from 40,000 to 50,000 acres, and costing over $2,000,000. (Hagerman, 1148, 1150; Tracy, 1133.) With the aid of irrigation a great variety of crops can be raised, among them being alfalfa, corn, oats, wheat, fruits and garden truck. (Mills, 1085; Poe, 1122-9; Hagerman, 1155.) Lands that without irrigation were not worth more than the government price of $1.25 per acre are now valued at $50.00 and upwards. (Tracy, 1134.)

The twelfth census report shows that 629,293 acres were under irrigation in the state of Utah at the time the statistics were taken, producing crops to the value of $7,462,510.00 in 1900.

The present and future development of Wyoming absolutely depends upon irrigation. About 1,100,000 acres had been reclaimed at the time of the taking of evidence in this case, and from $5,000,000 to $10,000,000 had been invested in irrigation ditches and reservoirs. It is stated that three-quarters of the population is sustained as the result of irrigation. (Johnston, 1023, 1032-4.) The assessed valuation of the state is $46,000,000, this being about one-third of the actual valuation. It is estimated that 65 per cent. of the assessed valuation is due to irrigation. (Johnston, 1032; Van Orsdell, 1055.) The Wheatland project in Wyoming shows what may be done with irrigation.

Here 60,000 acres, worth formerly $1.25 per acre, have been reclaimed and are now worth $40.00 per acre. This land supports 2,500 people. (Johnston, 1033; Clark, 1049; Van Orsdell, 1055-60.) With irrigation the future of this state is assured. Its unexcelled resources of water will make it one of the richest and most populous in the Union. (1023, 1034, 1040, 1047, 1289, 1179, 1181-2-4.)

Irrigation is utilized and is increasing in Nevada, North Dakota, Oklahoma, Oregon and Washington. (Jones, 1172; Newell, 1270-1272.)

The legislative department of the national government has shown appreciation of the vast importance of irrigation throughout the western United States. For a series of years large appropriations were made and used for the purpose of a thorough investigation as to the extent of arid lands which could be reclaimed, as to the water supply, possibilities of reservoir sites for storage and other features of the problem. These investigations resulted in what has been called the "Reclamation Act" of 1902 providing for the accumulation of a great fund from the sale of public lands in the arid states, such fund to be used for the purposes of reclamation of lands.

As already noted, Professor F. H. Newell is the chief engineer of the Reclamation Service of the Geological Survey of the United States, and in his interesting testimony in this record he tells what has been accomplished, what is being done and what is immediately proposed in connection with this great work. (Newell, 1267, 1272.) In addition to the large amount of money that had been already expended for the reclamation of lands at the time of the testimony of

Professor Newell on June 30, 1904, he tells us that there had accumulated in the treasury for like purposes at that time nearly thirty millions of dollars. (1268.) He says also:

> "The fund is being added to by the disposal of public lands, so that if all the money comes back to the fund and additions are made to it, it will become a very large amount and will result ultimately, under good administration, in the reclamation of all of the arid lands not otherwise taken care of."

And he adds:

> "It is impossible to continue the work unless we are permitted to use the waters of streams for irrigation; in fact, it is based upon the assumption that all of the water wherever it is found may be held in reservoirs and completely utilized, respect being paid only to prior rights of appropriation and beneficial use." (1272.)

We respectfully submit that the importance of this right to appropriate water from streams and to use that water for the irrigation of arid lands can not be overestimated, and that upon the vindication of that right rests the future prosperity of nearly one-half of the United States.

XI.

COLORADO, RELYING UPON ITS RIGHT TO UTILIZE THE WATERS OF ITS NATURAL STREAMS UPON ADJACENT LANDS, HAS CONVERTED ARID AND UNINHABITED WASTES INTO POPULOUS DISTRICTS, WITH PRODUCTIVE FARMS AND THRIVING TOWNS AND INDUSTRIES.

Colorado is essentially an arid state, and, except in isolated places, irrigation is absolutely necessary to the successful cultivation of the land.

By the 12th United States census report, the acreage of the improved (irrigated) land is given as 2,273,968 acres. This is equal to the total of all the improved lands in both the states of Massachusetts and Connecticut. (Carpenter, 1829.) The value of the improvements upon this land is stated by Mr. T. C. Henry, than whom no other is better informed, to be approximately one hundred million dollars. (Henry, 707.) The total amount invested in irrigation projects in the state is estimated by this witness as between fifty and fifty-five millions of dollars. (Henry, 706, 710.) Mr. Henry gives details of the construction of twelve irrigating ditches under his personal supervision, involving an outlay of $5,550,000. (Henry, 703-5.)

On the western slope of the Rocky mountains, with a drainage to the Pacific ocean, are the valleys of the Grand, the Gunnison, the Uncompahgre and the Las Animas rivers, and their tributaries, all of which are exceedingly fertile and productive. (Carpenter, 661; Henry, 703-7.) In the south central portion of the state we have the Rio Grande running through the San Luis park, a valley sixty miles wide

by one hundred miles long. (Twitchell, 1103.) In the northeastern portion of the state are the fertile and prosperous valleys of the South Platte, the St. Vrain and the Cache la Poudre, with the towns of Greeley, Longmont, Fort Collins, Fort Morgan and others of less importance, all dependent upon the use of water in irrigation. (Carpenter, 661; Henry, 707, 710; Clark, 1052.) Specialties are being raised in these localities to a large extent, the value of the potato crop of Weld county alone aggregating as much as three million dollars in one year. (Carpenter, 667, 661.) This part of the state is also well adapted to the growing of sugar beets, the yield running as high as thirty tons to the acre, and the average production being from fifteen to twenty-two tons per acre. The value of land is necessarily high, as twelve tons of sugar beets per acre is a profitable crop. Other crops, such as onions, raspberries and currants, have been specialized with astonishing results. (Carpenter, 660-1, 665.)

We call especial attention to what has been accomplished in Colorado by the use of the water of the Arkansas river and its tributaries, when applied to beneficial uses in irrigation. This use is the alleged foundation of complainant's action.

The early explorers and pioneers found here a barren, treeless waste, with some "tame grass" in wet places, and a few cottonwood trees scattered here and there along the Arkansas river. So unusual was the sight of even this poor class of timber, that a few trees just east of the present west line of the State of Kansas caused the spot to be known along the overland trail as "Big Timbers." (Galbreath, 796; Spencer, 814.) The river itself in those early days was

such an insignificant stream as to be noticeable chiefly by its broad and sandy bottom and lack of water, particularly east of the present site of the town of Rocky Ford, Colorado. (See history of the river, *supra*, Division II.)

Old timers, men of advanced years, have been produced as witnesses in this cause, who at the time of their examination had a vivid recollection of their astonishment upon first coming to the bed of the Arkansas and finding there sometimes but little and upon other occasions no running water. They could not at first believe that this bed of dry sand was really the Arkansas river. (Conley, 859; Baldwin, 744; Newton, 788.)

A half century of persistent work, prosecuted at first under conditions that were extremely hazardous to life, on account of the hostile Indians, and always under climatic conditions, as to moisture, that disheartened all but the most intrepid, has, with the application of the water of the streams—such waters often recaptured and used over and over again—transformed this barren waste into luxuriant farms, producing abundant crops. (660, 709, 710, 894, 974, 978, 1376.)

In this land of the farmer and horticulturist can be seen the homes of the happy thousands whose fortune has cast their lot this way. Dotted here and there are towns and cities supported by the large and increasing population attracted by this new—yet old—method of bringing forth crops by irrigating the lands, thereby eliminating the uncertainty to which men had been accustomed in the eastern United States.

The extent and magnitude of the reservoirs and canals already constructed, and the amount of capital invested in such works in the Arkansas valley in Colorado, show the reliance placed by the inhabitants upon the stability of irrigation. The capital invested in the canals in the Arkansas valley is given at four millions of dollars. The census report for 1902 shows that in that year there were 300,000 acres irrigated in this valley from 795 irrigation systems. The number of farms is given as 4,557; the value of the land runs from $30.00 to more than $500.00 per acre. (Carpenter, 654; Cressy, 895-9.) Other estimates of acreage run from 250,000 to 350,000. (Chew, 497; Carpenter, 654, 769; Barber, 1773-4; Carpenter, 1821.)

Professor Mead, as we have already suggested, is of the opinion that the system for distribution of water followed in this valley is one of the best in the United States. (Mead, 1376.) The particular products of the valley are peaches, cantaloupes, wheat, oats, alfalfa and other grasses, sugar beets and apples. (660, 709, 710, 894, 974-8, 1895, 1376.)

Aside from the industries that are supported primarily by irrigation, there are many built upon faith in the permanency of the right to divert the water of the natural streams, and apply the same to beneficial uses.

In speaking of some of these, the secretary of the Colorado Fuel & Iron Company, at Pueblo, Mr. D. C. Beaman, says:

> "In round numbers the present investment of the Colorado Fuel & Iron Company

and its auxiliary companies in the drainage area of the Arkansas river in Colorado is about $30,000,000. This investment comprises eighteen coal mines, some 2,500 coke ovens, two limestone quarries and the Minnequa steel plant at Pueblo, and part of the Colorado & Wyoming Railway.

"The steel plant investment, I suppose, is in the neighborhood of $12,000,000 or $15,000,000. I know of none west of the Mississippi river that are nearly as large. There are twenty-eight steel and iron mills; when running at full capacity the finished product is about 550,000 tons per annum. The coal mines at full capacity produced about 3,500,000 tons of coal, the coke ovens 75,000 tons, and the lime quarries 400,000 tons.

* * * * * * *

"As to the values of these products, I could not separate them very well, but its aggregate is approximately shown by the gross earnings for the year ending June 30, 1903, which were $16,653,000.00.

* * * * * * *

"The number of employes when running full is about 16,000. As to the number of people dependent upon the operations of the company, I have figured it on the basis of what I call dependents on the operations, which is a little broader than the mere fam-

ilies of the employes. For instance, take what we call a coal mining camp. Everybody who lives there is dependent upon the operations of the mine, because if the mine is shut down the camp will be abandoned, so that the merchants, grocers, teamsters, and in fact everybody there, is dependent upon the operations of the company. On that basis I figure that there would be five dependents to one employe, which would make about 80,000 persons in addition to the employes, or a total of 96,000 persons dependent upon the operations.

"The pay-rolls run about $600,000 a month, and will aggregate in a year something over $9,000,000.

"The operating expenses are about $6,000,000 more, making a total disbursement of about $15,000,000; but that does not include material bought elsewhere, but simply the expenses incurred in the operations. This money is most of it paid out within the limits of the state." (730.)

This great and growing industry requires large quantities of water in its operation, which the company has secured at great expense by buying up some of the oldest water rights in the state and by the construction of an elaborate system of reservoirs supplied from the Arkansas river. (Chew, 493, 519.) In the operation of the steel plant at Pueblo about nine millions of gallons of water are required daily. (Chew, 493; Beaman, 730.)

In Fremont county, where the river first emerges from the mountains, there is a great orchard district, where one tract of thirty thousand acres is valued at $500.00 per acre. (DeWeese, 842.) Experience has demonstrated here, as elsewhere throughout the state, that crops grown with irrigation give both a larger yield per acre and a much better quality of product than can be raised in the humid territory. (662, 771, 907, 1377.)

Canon City, located at the mouth of the canon where the Arkansas river emerges from the mountains, has a population in and adjacent thereto of about ten thousand people, ninety-five per cent. of whom are dependent upon irrigation. (DeWeese, 842.) The assessed valuation of the county is $6,500,000.00, this being one-third of the actual value, most of such valuation being dependent upon irrigation. (DeWeese, 843.)

Among other industries dependent upon irrigation and showing the development of the Arkansas valley in Colorado are flouring mills at Las Animas, La Junta and Lamar, the latter with a capacity of five hundred barrels per day, and under operation night and day most of the year. (Bent, 975.) The factories for the canning of fruits and vegetables at Rocky Ford, Manzanola and Holly all have large and increasing outputs. (Wiley, 1436.) The town of Rocky Ford, in Prowers county, is the center for the growing of cantaloupes in the Arkansas valley. In addition to those sent out by express, there have been as many as five hundred carloads shipped in one season from Rocky Ford alone, involving freight charges averaging more than $900.00 per car. (Swink, 908, 910; Evans, 921; Carpenter, 660.)

There are three factories for the manufacture of beet sugar in operation in this valley. One of these, the plant located at Rocky Ford, cost upwards of one million dollars. To supply this plant 13,000 acres of sugar beets, with an average yield of fifteen tons per acre, are required. The farmers receive five dollars per ton for the beets, which are of superior quality, running as high as twenty per cent. in saccharine matter. (Carpenter, 660; Evans, 922.) The waste product of the factories supports a constantly growing industry in the feeding of cattle and sheep upon the beet pulp. (Evans, 921.) Water is absolutely necessary for the cultivation of the beets, and also for the manufacture of sugar. (655, 902, 894, 910-922, 1377.) The only source for the supply of that water is the Arkansas river as it flows down through Colorado.

The population of the immediate valley of the Arkansas river is now about 175,000. (Beaman, 733.) Without the right to apply to beneficial uses upon the lands the waters of the Arkansas river, the country would go back to its original barren condition, and the people who now occupy these lands would, of necessity, be driven out. (654-660, 707, 770, 840-3, 733, 894, 902, 907-10, 922, 938, 975, 1366, 1376, 1432.)

The conditions hereinabove disclosed, and as set forth generally in the preceding division of this argument, will have special significance when we come to consider the real scope of those modifications of the common law which are universal in America, to wit, those modifications which are required by "the conditions and wants of the people."

XII.

KANSAS HAS NO RIPARIAN RIGHTS DERIVED FROM THE SO-CALLED UNDERFLOW.

In entering, as we are now about to do, upon the discussion of legal questions involved in this cause, we shall abstain, so far as practicable, from consideration of merely moot questions. We are to consider the legal rights of the parties, in view of the facts established by the evidence in this case. It is the Arkansas river, as a specific stream, with the character which has been impressed upon it through the centuries, that is to be considered. We are not considering a stream like the Hudson, or the Danube, or the Rhine. So, in considering specific matters, such as the alleged "underflow," we must consider them in the light of established facts, and not in the light of some preconceived theory which is inconsistent with the true facts.

In this view of the subject we find ourselves, at the outset, compelled to dissent from the proposition of the Kansas brief under its section 29, in which it says:

> "The underflow is a subterranean stream." (Pl. Br., 223.)

Counsel, referring to a previous section of their brief, say:

> "It will be seen that a great number of residents of the valley, many of them for a third of a century, and *all the experts* who have examined this flow, measured its veloc-

> ity, and explored its depths and widths, concur in the precise descriptions by which the law recognizes subterranean streams as distinguished from percolating waters. They unite in declaring that *it has well defined limits on each side,* an almost *uniform depth,* and a steady appreciable current with a well established direction." (Pl. Br., 234.)

We have very fully discussed the facts relating to the alleged underflow in Division IV of this argument (*supra,* page 159), and we shall not here repeat the argument or quotations there presented. But, in view of this statement of counsel, some further allusion to the facts may be necessary before considering the law upon this subject. Kansas alleges and contends that

> "the water which flows in the river from the State of Colorado into the State of Kansas furnished the principal and almost the entire supply of water for the underflow in the valley."

Counsel say that the witnesses unite in declaring that this underground "stream" has well defined limits on each side, and an almost uniform depth, and counsel at various places in the argument contend that it is the full width of the valley, from foothills to foothills.

Now, Mr. M. M. Murdock, the first witness produced, says:

> "My notion is that the rains which fall along the crest of the mountains sink into the

ground *without going to the river* and proceed on their course with the pitch of the country, and that furnishes a great underground flow or sheet of water underlying this country. I don't know how much of a sheet it is, but I can't account for this great body of water underlying this land in any other way. The little body of water coming out of the gorge [Royal Gorge of the Arkansas river in Colorado], it doesn't come out of that. That country from here to the Rocky mountains is a great inclined plane, falling seven or eight feet to the mile. Now, on the base of that inclined plane the substratum, or what it is made up of, is all sand and gravel. If water is poured in up at the upper end, why would it not come down this way? It does.

"The width of the valley here varies. Eighteen or twenty miles above it will be twenty miles wide; at this point it is only about five miles wide. It varies. And from the information I have gathered, I am inclined to think that this valley of about five miles in width is practically filled something like 1,000 feet deep. I don't know how fast this water under the surface moves. I was told the other day by the United States expert that he thought it went only about nine feet in twenty-four hours; but I scouted that idea. I can't see how a country could fall eight feet to the mile and the water not flow

faster than that through this gravel and sand. I have never made any tests myself." (259.)

Thus, we have the first witness for the complainant fixing this underflow at a width of from five to twenty miles, and a thousand feet deep, with an unknown rate of movement, but associating that movement with the fall or slope of the country.

Complainant's witness S. S. Dickinson tested the current of the underflow during a time of rising water in the river; he stood by a hole in the ground where the water raised two inches while he remained there, and Mr. Dickinson determined the fact of a current and the direction of the same by spitting tobacco juice in it, and he was able to see the resultant deposit pass from the west end, up the stream, down to the lower end and out of sight. (1985.) Now, this Mr. Dickinson has this underflow running out on both sides of the bed of the Arkansas, supplying adjacent parallel streams and tributaries at long distances from their junction with the main river. He has himself observed the influence of the river upon the underflow for nearly twenty miles. (1986.) This is a very moderate statement, as compared with his final conclusion upon the subject. He further says:

"As to how far from the Arkansas river this underflow, which I said is supplied by the river, extends, I will answer, to the foothills. As to how far that is, well, commencing at Dodge it is six or eight miles wide, and it holds east until it gets down here opposite Ellinwood and Sterling, where it is

eighty miles wide. I think under that is an underflow supplied by the Arkansas river. As to how deep up and down, I think one can find water supplied by the Arkansas river, I will say, that is according to the strata that you get in to find water. In some places it is as much as a hundred feet, or if you go deeper you will find it, but in one well down here at 740 feet, we get down into the salt water at that depth." (1998.)

We do not know whether Mr. Dickinson is considered by the complainant as an "expert," or only as a common, everyday witness. He was examined at unusual length by both complainant and defendant, and on cross-examination the following questions and answers occur:

"Q. Well, you don't say that this thing which you call an underflow, that is forty or fifty or a hundred feet under the ground, helps your crops, do you? A. It don't do them any harm. No, it don't help them any, not that deep water, but there are strata of water a great deal higher than that. The one that gives the immediate returns is that water which you first strike when you start down from the surface, yes, sir. If in following the level of that water up over a ridge you find that it rises higher than the river, as to whether I should contend that that is supplied by the river up there above the river, I would say I do, sir, for the water in the river is holding this water up there while the

water up three or four miles back—the river is forcing it down through that channel, and it goes over a ridge in the same way.

"Q. And when you supply the Rattlesnake over the ridge from the river, you are practically siphoning it over? A. That is right, sir, it works as a siphon." (2002.)

Now, these witnesses give us practically an underground *sea,* from one hundred to one thousand feet deep, and from five to eighty miles wide.

But in view, however, of counsel's statement about the "experts who have examined this flow," let us consider the evidence a little further.

It is true that Professor Slichter, speaking of his examination in the vicinity of Garden City, said:

"We found ground water there and it had a motion in every instance. It was flowing generally toward the east, corresponding generally with the main trend of the Arkansas river valley. The rate of movement varied in different places with the coarseness of the material. The average rate of all the measurements, including the slow and the fast, was about eight feet in twenty-four hours." (1336.)

Professor Slichter, however, had distinctly testified that this was the ordinary ground water or "sheet water," and that its main supply was from rainfall. And he finds this from various tests, and, among others, chemical tests. He says:

"Yes, the analyses of water which I made at these different places is another indication which convinces me that the main source of supply of the ground water is the rainfall and not the stream itself. The other reasons that are [another reason that is] especially pertinent in this connection is the conclusion that must be drawn from the slope of the ground water plane as determined from the levels which we ran. A map has been prepared showing the slope of the water plane north and south of the river. It is observed to slope toward the east at an almost uniform rate of about seven and one-half feet to the mile, and the river channel itself has a very slight influence upon this sloping of the water sheet. At many places the position of the river could not be located from the map of the water plane if its position was not known from other reasons." (1339.)

The witness says in another place, speaking of a certain portion of the river, that "the current of the underflow is nearer straight east than the channel of the river by six degrees at this point." (1345.)

The witness, speaking of the rate of movement in the vicinity of Dodge, says:

"I found the rate there in the channel at Dodge, one determination only, to be three feet in twenty-four hours. That was made in 1901. (1348.)

Now Professor Slichter expressly says that the underflow of which he has been speaking consists of

waters commonly called percolating or ground waters. (1361.) And the following questions and answers occur in the record:

> "Q. So far as the rapidity with which they move is concerned, these ground waters move no faster than what you denominate percolating waters, if as fast, do they? A. No, sir, no difference in that respect.
>
> "Q. None of these ground waters of which you have spoken are such as can be designated underground streams of water flowing in *defined channels,* are they? A. *They are not.*" (1362.)

Mr. Willard D. Johnson, one of the scientific witnesses introduced by the Government, says:

> "I determined the general fact that the water plane sloped and that the ground water body moved. From my investigations and study of this question I would say that the source of the supply of this sheet of underground water in the valley of the Arkansas river is from the ground water on either side drawing in toward the river on that slope. Absolutely none of it comes from the flow in the river itself. It is impossible. But I should qualify that statement. I was speaking in a broad, general way. There is a little narrow, insignificant belt close to the river that would back up a little water." (1224.)

Mr. Johnson had already said:

> "In the Great Plains region the condition is somewhat peculiar in that there are

no mountains or rocks sticking out from the surface, but the whole thing is buried under a great sheet of gravel and sand, which, together with clay, covers the Great Plains' rough rock surface and is saturated with ground water up to some level, varying in depth below the surface, which is called the ground water surface or the water table. It is a universal plane." (1222.)

Mr. Johnson, further speaking of the underflow, says:

"It is a great mass of water moving as a mass, but irregularly moving, and it moves under these valleys, and *it can not be said that any one of these valleys has an underflow peculiar to itself.* The whole plains have an underflow, and on the surface of the plains rivers run, and they do not always run in just the same direction the ground water moves in." (1241.)

Mr. Johnson further, in comparing the "plains surface" and the ground water surface, says:

"The ground water surface on the upland is practically a level plane, then toward the river it slopes toward the river. The one plane slopes steeper than the other, and they both come together at the river as two planes, one dipping faster than the other. The ground water is not as steep a slope as the surface of the ground, therefore the two meet exactly at the river as the river drains down the ground water." (1249.)

Mr. N. H. Darton, another of the expert witnesses, says:

> "I will say that the great plains are covered by gravels and sands which contain sheet water. That is common to the entire world, almost, where there are superficial deposits. They retain the rainfall. * * * The source of the underground waters along the Arkansas river is the rainfall and the melting snows. I think only in a very small measure it is fed by the streams which flow through the arid regions upon the plains." (1256.)

Speaking of the vicinity of Syracuse and Coolidge, he says:

> "The ground water in that vicinity is due mainly to the water that flows on the slopes that rise out of the valley and *not from the river.* * * * The general direction of the movement of the ground water in the vicinity of the Arkansas river in western Kansas is toward the river in part, and in part down the valley, so that it is diagonal to the course of the river." (1257.)

Professor F. H. Newell says that

> "in the great plains region and throughout much of the country the so-called sheet water exists and has a definite, perceptible movement which we are now detecting by means of electrical apparatus devised by Professor

Slichter. This underground or sheet water extends along the valley of the Arkansas river as a part of the general sheet water underlying the entire plains area." (1265-6.)

Professor Newell also sustains the witnesses we have already quoted as to the direction and character of the movement of this underground water. (1279.) And finally he says:

> "Percolating waters, as I use the term, are the waters which progress toward the line of least resistance through gravels or sands or other pervious strata. The ground water is percolating water, yes, sir. *There is no possibility of defining its boundaries* except as they are coincident with lines of gravel or clay. The direction of its flow follows the line of least resistance, which is modified by the descent or the porosity of the material." (1284.)

Professor Haworth is the state geologist of Kansas. He was not produced as a witness by the State of Kansas on this hearing. (And we would say that Kansas did not produce any men of scientific training and observation to support her contentions.)

Professor Haworth, in a report to the legislature of Kansas in 1897, uses the following language:

> "The term 'sheet water' is now about as widely used as 'underflow,' and practically means the same thing, so that in common usage the two terms are synonymous. The

latter term expresses within itself the popular idea of the great lateral extent of the water, and says nothing about its amount, while the former expresses the popular notion of movement and says nothing of the lateral extent. The 'underflow' or 'sheet water' is therefore the water so often referred to in the preceding pages, and *corresponds with similar masses of water found in all humid parts of the world* wherever we have in combination the two conditions, a loose, porous surface mantle of considerable thickness and a firm, impervious floor beneath, provided, of course, the floor is not so greatly inclined that the water will flow away as fast as it accumulates." (1856.)

Professor L. G. Carpenter says:

"From my own investigations and the investigations conducted under my direction, and those of others, it is not my opinion that what is spoken of as the 'ground water' or 'underflow' in Kansas is water flowing in well defined channels. It is simply water oozing through the layers of sand and percolating through those interstices." (685.)

He says that in his judgment

"those underground waters lying outside of the immediate bed of the river have no defined channel, such as that used to designate a stream by. Those underground waters are simply oozing through the sand, mostly a fine

sand, and, of course, going in the direction in which the surface water falls, but at an extremely slow rate." (773.)

The extracts we have made from the evidence of the expert witnesses, Professor Slichter, Mr. Johnson, Professor Newell, Professor Carpenter, and from the published report of Professor Hayworth, are so diametrically opposed to the statement of counsel above quoted, that it would seem as if counsel were speaking of some other case, and not of this one, which presents the evidence here collated.

It is as to waters of the character described by these witnesses, not such as are described by counsel in the Kansas brief, that we have to make our inquiries in the determination of legal rights, and we do not need to go beyond the very citations of authorities made by counsel in their brief, for a complete refutation of their contention, when applied to the true facts of this case.

Case vs. Hoffman, 84 Wis., 438.

In this case the court adopts a definition of watercourse, which includes the following:

"It must flow in a definite *channel,* having a bed, sides or banks, *and usually discharging itself into some other stream or body of water.*"

The opinion also adopts the following:

"In *Earl vs. DeHart,* 12 N. J. Eq., 280, it is held that when the country is such that the water from rains and melting snow is

necessarily collected into one body so large as to require an outlet, and is discharged through it in a *well-defined channel,* where it is accustomed to flow, and has flowed from time immemorial, *such channel* is an ancient watercourse."

Again, it is said:

"A spring *becomes a watercourse* at the point where the water comes to the surface and *flows off* in *a defined channel or bed,* with banks or shores which confine the water and cause it to run in a certain direction. * * * If a watercourse is lost in a swamp or lake, it is still a watercourse *if it emerges therefrom in a well-defined channel,* or if it spreads over a meadow, and it can be identified or traced as the *same stream,* it is still a watercourse."

All of the foregoing citations are found in the complainant's brief (pages 231 and 233).

The case of *Dickinson vs. Grand Junction Canal Company,* 7 Exch., 282, cited by Kansas through the medium of "Kinney on Irrigation," distinguishes the facts of that case from a previous decision of the court, as to which it says:

"In such a case the existence and state of underground water is generally unknown before the well is made, and after it is made there is a difficulty in knowing certainly how much, if any, indeed, of the water of the well,

when the ground was in its natural state, belonged to the owner in right of his property in the soil, and how much belonged to that of his neighbor, who, in digging a mine or another well, may possibly be only taking back his own. These practical uncertainties make it very reasonable not to apply the rules which regulate enjoyment of streams and waters above ground to subterranean waters."

As to this case of *Dickinson vs. Grand Junction Canal Company,* the House of Lords afterwards had occasion to criticise a portion of the decision, and after quoting the passage above set forth, and referring to the conclusion of the court below, said:

> "But the court, without at all adverting to this distinction which it had adopted, treated the case of underground percolating water as governed by the same rules as would obtain in the case of visible streams and watercourses above ground; and no remark or comment was made or reason assigned by the court for arriving at a conclusion which not only does not seem warranted by the premises previously adopted, but is in effect hardly consistent with them."
>
> Chasemore vs. Richards, 7 H. L. Cas., 349, 369.

For similar views by the then lord chancellor, see same case, page 378, and see, also,

> City of Emporia vs. Soden, 25 Kan., 610 (Brewer, J.).

Counsel also cites *Farnham on Waters,* section 944, and yet, in that very section, and in the quotation made from it, we find the rule stated in this way:

> "When a section of the *original bed* of a stream has been filled up by sand accumulating on the surface, the water may still find its way along and through its *ancient bed,* and while its passage may be through sand and gravel, nevertheless it is a part of the flow of the waters of the creek, and governed by the same rules of law as a stream flowing entirely on the surface."

The quotation which counsel makes from the case of *Vineland Irrigation District vs. Azusa Irrigation Company,* 58 Pac., 1057, refers to

> "the existence of a well-defined subsurface flow *within the beds and banks of streams.*"

Manifestly, these citations, in the minds of the persons writing, had reference to the stream beneath the existing *channel,* and had no reference to a spreading sheet of water, such as complainant's witnesses have described, extending from five to eighty miles across the country.

Counsel, however, with a great deal of confidence, rely upon two Colorado cases, which they say

> "have held *this stream* to be part and parcel of the surface flow,"

and they say

> "we are curious to see how the defendants will meet these decisions of the highest court in their own state." (Pl. Br., 234.)

We assume, when counsel refer to "this stream," they do so by deduction, and not by reason of the fact that the "underflow" of the Arkansas river is mentioned in any of the cases which they cite.

The earliest of the cases from which they quote is *The Platte Valley Irrigation Company vs. The Buckers Irrigation Company,* 25 Colo., 82. Upon examining that case we find that the court below had determined that the outlet from Beaver lake was a natural watercourse, through which a quantity of water found its way *"to the bank* of the river, where it disappeared in the sands of the river-*bed,"* and it was on such a case that the law was considered and the language used which is quoted by counsel, and, even in the very passage cited, the court describes the underflow as "the subterranean volume of water which slowly finds its way through the sand and gravel *constituting the beds* of the streams which traverse the country adjacent to the mountains of this section." And after considering the physical features of the case, the court says:

> "With these physical conditions present, it will be presumed that water flowing in a *natural channel,* which reaches the *banks* of a stream and *there* disappears in the sands of the *bed,* augments the flow in the main stream by percolation, until the contrary is shown." (Page 82.)

It seems that the same waters were involved in the other case cited by counsel, to wit: *The Buckers Irrigation Company vs. The Farmers Ditch Company,* 31 Colo., 62, 71. The finding of a jury in the court below was that each of the streams in controversy was a tributary of the river, and the case is decided upon an acceptance of this as a fact. The court says on page 70:

> "By these ditches the defendant companies not only intercepted the original surface flow of these streams and withdrew water from the sloughs or lakes supplying them, but have likewise diverted the water saturating the sand and gravel constituting the *bed of their channels* and sources. *This* water is as much a part of the several streams as the surface flow, and is governed by the same rules."

And in the very passages cited by counsel the reason why the doctrine of percolating waters was not involved was said to be because the water referred to passed through sand and gravel "constituting the *bed* of the stream and the land so nearly adjacent that the only natural outlet would be through *such channel.*" (Page 71.)

Counsel might also have cited, as of the same purport, the case of *Medano Ditch Co. vs. Adams,* 29 Colo., 317, where the court uses like language, and in that case will be found facts very similar to those which in this case suggest the evidence of an ancient channel from the vicinity of Coolidge or Syracuse, running southeasterly, to and connecting with an ancient channel under the Cimarron (*supra,* pages 182-6).

But in view of the facts, and the true character of this alleged underflow, the case cited by counsel from California, *Los Angeles vs. Pomeroy,* 124 Cal., 597, becomes a strong authority against the complainant's contention. That case gives some definite rules for determining when underground waters are subject to the law affecting surface flow. The court, after describing conditions in the Great Plains and valleys of the west, divides watercourses into two distinct classes, to wit: "Those whose channels are known or defined, and those unknown and undefined," and the court says:

> "It is necessary to bear this distinction in mind in our discussion, as they are governed by entirely different principles of law. And in this connection it will be well to say that the word 'defined' means a *contracted and bounded channel,* though the course of the stream may be undefined by human knowledge; and the word 'known' refers to knowledge of the course of the stream by reasonable inference."

The court says that:

> "The owner of land under which a stream flows can, therefore, maintain an action for the diversion of it if such diversion takes place under the same circumstances as would enable him to recover if the stream had been wholly above ground. But for this purpose the underground water must flow in *known* and *well-defined* channels, so as to constitute regular and constant streams, in

order that the riparian owner or appropriator may invoke the same rules as are applied to surface streams, or otherwise *the presumption will be* that they have their *sources in the ordinary percolations* through the soil. This rule practically disposes of the second class of subterranean waters—those whose channels are unknown and undefined—although there are undoubtedly a great many underground streams whose waters flow in confined channels, but whose courses are not known, and, following the above rule, these are all classed with 'percolating waters.'" (Pl. Br., 229.)

Now, when these principles of law, as enunciated by the very authorities cited by counsel for the complainant, are applied to the facts of this case, it becomes apparent that they not only do not justify, but they refute the argument and conclusion which counsel seek to draw from them. These waters in the valley of the Arkansas are not by any evidence shown to come from any specific point as place of origin. They are not shown to have any specific outlet. The great preponderance of the testimony, and practically all of the scientific testimony, was that they are part of the ordinary underground water of the Great Plains, and that their source of supply is the rainfall that descends upon those plains. There is no definite channel to mark their course. Even though they have no greater extent laterally than as claimed by the complainant, yet, this lateral extent is not that of a watercourse, but of a *sea*, five, twenty, eighty miles in width. The very statement of this condition, as presented by

the non-expert testimony of the complainant, shows that these waters are, as the scientific witnesses claim, merely a part of the great underlying ground water of the country, sloping, indeed, to the east, because the country slopes to the east; with a slow movement to the east, because of that descending slope of the country in that direction; but with a movement so slow that, according to one of the non-expert witnesses, it takes a year for salt water, that comes to the surface from a certain well, to reach another well a mile away, and with an average motion, according to expert testimony, of about eight feet per day, or a little more than half a mile in a year. The real facts are so far removed from the theory upon which counsel argue this branch of the subject, that we feel that it is unnecessary to go into any more exhaustive presentation of the law.

XIII.

EVEN IF KANSAS POSSESSES RIPARIAN RIGHTS TO THE FULL EXTENT CLAIMED BY HER, YET SHE HAS NO RIGHT OF ACTION IN THE ABSENCE OF INJURY, INFLICTED OR THREATENED.

The Kansas brief in its section 28 makes the contention that the right of a riparian owner on a stream to its flow as it was accustomed to run does not depend upon his use of the water. And counsel say:

> "He may compel upper riparian owners to leave the flood go by him unpolluted, unimpaired and undiminished without making

> any use whatever of it himself. He has a right to stand upon the bank and see the stream flow as it was accustomed to run, if he never dips a foot in it, drinks from it, or makes any beneficial use whatever." (Pl. Br., 221.)

Without at present entering into any controversy on the proposition here stated in the Kansas brief, we must, nevertheless, call attention to the fact that the existence of any such right, even though it be conceded to be as strong as stated by counsel for Kansas, does not give any right of action unless some injury has been inflicted or is threatened. This principle is so fundamental that it seems to us unnecessary to cite authorities.

The case of *Clark vs. Allaman,* decided by the Supreme Court of Kansas (80 Pac. Rep., 571), however, is a case from which the complainant makes copious quotations in another connection, and upon the proposition now under consideration it may be worth while to call attention to what the Supreme Court of Kansas says in an irrigation case. In that case the court adopts the language of the Nebraska Supreme Court, as follows:

> "The mere fact that the riparian proprietor is deprived of the full flow of the stream adjacent to his land would furnish no basis for compensatory damages. Merely diminishing the volume of water in the stream would not deprive the owner of property for which he could lay claim to a pecuniary compensation. At most, the naked

right to the full flow of the stream, and its loss by diminishing the volume of water when appropriated for irrigating purposes, could result only in *damnum absque injuria*. In order to entitle the riparian owner to compensation he must suffer an actual loss or injury to the use of the water which the law recognizes as belonging to him, and to deprive him of which is to take from him a substantial property right. It is for an interference with or injury to his usufructuary estate in the water for which compensation may rightfully be claimed, where the water of the stream is diverted and appropriated for the use of irrigation. It is such a taking of or damage to property as materially and substantially depreciates the value of the real estate of which it forms a part."

Crawford vs. Hathaway, 93 N. W., 781; 60 L. R. A., 889.

And the Kansas Supreme Court proceeds as follows:

"In other words, a diminution of the flow of water over riparian land, caused by its use for irrigation purposes by upper riparian proprietors, occasions no injury for which damage may be allowed unless it results in subtracting from the value of the land by interfering with the reasonable uses of the water which the land owner is able to enjoy." (80 Pac. Rep., 585.)

In one of the cases cited by counsel, *Reeves vs. Backus-Brooks Company*, 83 Minn., 339, the court, in

announcing the doctrine upon which counsel rely, says:

> "The plaintiff's rights as proprietor of land abutting on the river are exclusive, and, *if substantially interfered with,* he is entitled to recover damages. Any substantial or unwarranted interference with them constitutes a trespass, for which he is entitled to compensation, and, if such trespass is of a permanent character, he is entitled to a writ of injunction prohibiting a continuance of the wrong." (P. 343.)

In recognition of this fundamental rule of law, the complainant in its amended bill sets forth at length injuries which it alleges have been inflicted by the defendants as a result of the diversion of water in Colorado for purposes of irrigation. This court, in considering the demurrer to the original bill, withheld opinion upon many of the questions raised until proof should be adduced, and said:

> "We think proof should be made as to whether Colorado is herself actually threatening to wholly exhaust the flow of the Arkansas river in Kansas; whether what is described in the bill as the 'underflow' is a subterranean stream flowing in a known and defined channel, and not merely water percolating through the strata below. * * * What lands in Kansas are actually situated on the banks of the river, and what, either in Colorado or Kansas, are absolutely dependent on water therefrom. * * * The pos-

sibilities of the maintenance of a sustained flow through the control of flood waters; in short, the circumstances, a variation in which might induce the court to either grant, modify or deny the relief sought, or any part thereof."

Kansas vs. Colorado, 185 U. S., 125, 147.

The evidence has now been taken. We have discussed it through the preceding pages of this argument. We respectfully insist that absolutely no injury has been shown. This is not even a case of *damnum absque injuria,* because we may fairly say that *no* damage has been proved to result in the slightest degree from Colorado irrigation in any of the particulars alleged in the amended bill.

In the very recent case of *Missouri vs. Illinois,* 26 S. C. Rep., 268, this court dismissed the bill because when the evidence was taken the proof fell so far short of the allegations of the bill as not to make a case to invoke the action of this court in favor of the complainant. And speaking of such cases, this court there remarked:

"Before this court ought to intervene, a case should be of serious magnitude, *clearly and fully proved,* and the principle to be applied should be one which the court is prepared deliberately to maintain against all considerations on the other side." (Id., 270.)

And, in saying this, this court cited the case of *Kansas vs. Colorado,* 185 U. S., 125.

In the case at bar the failure of the proof submitted by the complainant to sustain the allegations of the amended bill is much more marked than was the case in *Missouri vs. Illinois,* above cited, and we think this fact will abundantly appear from a consideration of the preceding pages of this argument, with the evidence upon which that argument rests.

By reason of the utter failure of proof as to injury inflicted, or threatened, we ask that this court dismiss the complainant's bill.

XIV.

KANSAS IS PRECLUDED FROM CLAIMING THAT HER "RIPARIAN RIGHTS" SHOULD TAKE PRECEDENCE OF THE BENEFICIAL USE OF THE WATERS OF THE ARKANSAS ON ARID LANDS IN COLORADO.

In this proposition we use the term "riparian rights" in the sense in which it is used by the complainant, to wit, "the right to the uninterrupted and unimpeded flow of all the waters of said river into and across the State of Kansas." (Record, 73.)

As will appear hereafter, we do not concede that riparian rights under the common law as it exists in Kansas have the limitations for which complainant contends, but for the moment we meet counsel upon their own ground, and we speak of such riparian rights as the complainant alleges it possesses; the one which they say in their brief has "been invaded by a

subsequent and different system, framed upon a different theory and built upon a different basis." (Pl. Br., 211.)

Our proposition is, that the State of Kansas is not in a position to claim any such right as is thus asserted in the amended bill and in the complainant's brief. It is an ancient maxim of law, and there are many of like character, that one making contradictory allegations shall not be heard. The law does not recognize the right of a party to blow hot and cold.

We do not, for the purpose of this discussion, need to go far back into the history of Kansas. It is sufficient to refer to the legislative acts of that state bearing upon this question, as shown in the General Statutes of the state. That state has a series of laws covering the subject of irrigation from the streams that flow in and through the state. These statutes cover some thirty-three pages in the General Statutes of Kansas for 1899, and one of the earliest in point of time is a law of February 26, 1886, which reads as follows:

> "The right to the use of running water flowing in a river or stream in this state for the purposes of irrigation may be acquired by appropriation. As between appropriators, the one first in time is the first in right." (General Statutes, section 3501.)

Now this statute, which has been in force ever since its enactment, entirely ignores "riparian rights" in the sense used by the complainant. There is no provision in that statute for the condemnation of any existing riparian rights. It is a statutory subjection

of all the running waters in the State of Kansas to the right of appropriation for purposes of irrigation. What counsel calls a "different system, framed upon a different theory, and built upon a different basis," is here found to be the declared doctrine by statutory enactment of the State of Kansas, the sole complainant in this action.

A subsequent statute made certain regulations by which claims of damages might be determined, but the claim for damage seems to have no reference to riparian rights, and, in any event, the claimant of damages must himself assert his claim. After publication of notice he must be the party to initiate demand for relief. (General Statutes, sections 3510-3512.) And the notice is a local notice in the county where the water is taken from the stream. Such notice given in Kearny county could hardly be treated as notice to riparian proprietors in Sedgwick or Cowley counties, nearly 300 miles down the river.

A still later act gave a certain order or rank to the purposes for which the water might be diverted and used west of the 99th meridian. The 99th meridian runs between Great Bend and Larned, and as to all the territory west of that meridian, the statute provided specifically that "all natural waters, whether standing or running, and whether surface or subterranean, shall be devoted, first, to purposes of irrigation, in aid of agriculture, subject to ordinary domestic uses, and, secondly, to other industrial purposes, and may be diverted from natural beds, basins or channels for such purposes and uses, provided that no such diversion shall interfere with, diminish or divest any prior vested right of *appropriation* for the *same or a higher purpose* than that for which such diversion

is sought to be made, without the due legal condemnation of and compensation for the same." (General Statutes, section 3519.)

It will be observed here that no reference is made to vested riparian rights under the common law, but that which is protected by statutory provisions, at least, is a prior vested right of *appropriation*, and appropriation for the same or a higher purpose. We call attention, also, to the fact, in this connection, that under this law the rank of uses is, first, domestic use, second, irrigation for uses in aid of agriculture, and third, industrial purposes. Water power for a mill would be in the third class, irrigation being a preferred use.

Now can Kansas deny to others the same right which she claims for herself? She stands alone as the complainant in this action, even though she sues as *parens patriae*. In this action the rights she represents can rise no higher than her own. We shall, however, presently consider, in another connection, the rights of citizens of Kansas, for whom the complainant may in some sense be called a representative, and for the moment we confine ourselves to the situation of Kansas as a proprietor. Now, can Kansas say—Here is a river that flows through our two states, rising in Colorado, flowing thence into and through Kansas; these waters are common, flowing first in one and then in the other. Now we, in Kansas, propose to divert those waters into canals and ditches and use them to irrigate our lands, but you, in Colorado, who have first access to those waters, must not so use them, but must permit the waters of that river to remain in the channel and to flow as they were accustomed to flow, and absolutely undiminished in quantity, to satisfy

our riparian claims. Is this a position which the complainant can take?

Counsel for complainant say—But Kansas has *vested rights;* by the admission of the state she became the owner in fee of the land within the meandered banks of the Arkansas river; she owns sections 16 and 36 wherever they touch the river, if they happen to do so; she owns a Soldiers' Home at Dodge City; she owns reformatory lands at Hutchinson; in 1863 she received a land grant from the federal government for every odd numbered section of land for a certain distance on each side of the A., T. & S. F. railroad, some of which she still retains; therefore, the State of Kansas has vested rights. But we would inquire, Did the State of Kansas not have these rights at the moment she enacted the law of February 26, 1886? If the State of Kansas, as a private proprietor, owned lands which then had riparian rights on the Arkansas river, did she not, by such legislation, at once, and necessarily, surrender those riparian rights in favor of any one within her own state who might desire to appropriate the waters of that stream for purposes of irrigation? She had it in her power to except from the effect of such statute any lands she held in private proprietorship upon the Arkansas river, as she had the power to protect any other riparian rights by the form of her legislation. She did not except these lands from the effect of the legislation by which she gave this general grant for the purpose of irrigation, and any right, riparian or otherwise, which she had to the flow of the river, was, after that legislation, necessarily held subject to the rights which should be acquired by appropriation under the statute which she had enacted.

The complainant's brief says that the Amazon Irrigating Company was chartered on the 29th of November, 1887; that it had a headgate for its canal on the north side of the Arkansas river in Kearny county. The canal was 24 feet wide, 4 feet deep and 100 miles long; it cost $150,000, and it would irrigate 35,000 acres of land.

Now, in the face of the statute of 1886, which we have quoted, could the State of Kansas say to the Amazon Irrigating Company—The state has a Soldiers' Home on the banks of the river some eighty miles down the stream below your headgate; the state has a vested right to have the full and undiminished flow of the river come there; it holds this under the ancient common law which has always been in force; you, therefore, must not take out the water at your headgate (except, perhaps, by special license in times of flood), but you must let the entire flow, without diminution, come down the natural channel of the stream, so that its waters will wash the bank along our Soldiers' Home? Of course, this suggestion only needs to be mentioned to show its absurdity. Having passed the statute giving the right, the State of Kansas could not herself claim a vested interest antagonistic to that right which she had granted. She would at once be met by the fact of her own legislative grant, and she would face those principles of estoppel which have constantly been applied, even to states, in their relations to individuals. As Judge Gresham has once said:

> "Resolute good faith should characterize the conduct of states in their dealings with individuals, and there is no reason, in

morals or law, that will exempt them from the doctrine of estoppel."

State of Indiana vs. Milk et al., 11 Fed., 389, 397.

Complainant's brief enumerates some eight large canals in western Kansas, being the canals to which we have referred in Division VIII of this argument. Even if those ditches had commenced operations prior to 1886, certainly, after the enactment of the statute above mentioned, the State of Kansas, as a private proprietor of riparian lands, could not say to the owners of those ditches that they could not thereafter divert the water, but must permit it to flow undiminished in quantity to the state's riparian lands below.

Under these circumstances what shall we say of the right of Kansas to this riparian flow as against the State of Colorado? Colorado, indeed, can not claim specifically the benefit of the statute of Kansas, but it has a statute of like character. Both states have pursued the same policy. For the accommodation of its citizens, and to meet their necessities, Kansas has initiated a practice in the use of its waters which had long been in existence in the adjoining State of Colorado. Kansas knew the provisions of the Constitution of the State of Colorado in reference to the waters of her streams. She could not be ignorant of the nature of rights asserted, or of those which would thereafter accrue, upon the waters of the Arkansas as they came through Colorado; and with knowledge of the Colorado Constitution, and its provisions upon this subject, and with knowledge of the custom prevailing in the adjoining state as to the waters which came from that state into Kansas, she

proceeds to adopt a like policy, which is in antagonism to that theory of riparian rights which she is now advancing in this case. Whatever may be said as to vested rights of individuals, certainly the State of Kansas, as a private proprietor of lands along the river or of the river bed itself, does not come with clean hands into this court as a court of equity in the demand she is now making.

This court, speaking of the discharge of sewage through the Chicago drainage canal into the Mississippi above St. Louis, uses this language:

> "Where, as here, the plaintiff has sovereign powers, and deliberately permits discharges similar to those of which it complains, it not only *offers a standard to which the defendant has the right to appeal*, but as some of those discharges are above the intake of St. Louis, it warrants the defendant in demanding the strictest proof that the plaintiff's own conduct does not produce the result, or, at least, so conduce to it that courts should not be curious to apportion the blame."
>
> Missouri vs. Illinois, 26 S. C. Rep., 268, 270.

Long before the institution of this suit, and even before the beginning of any substantial diversion of the waters of the Arkansas in Colorado, the sovereign State of Kansas offered a *standard* upon this subject to which the State of Colorado, as a defendant, *has the right to appeal.* Kansas having herself adopted

for the benefit of her citizens this policy of appropriating waters of her streams for purposes of irrigation, shall she be permitted to complain of the existence of a similar policy in her sister state, as to the waters of a stream common to both?

We respectfully submit that to entertain such a claim on the part of the State of Kansas, in view of her own policy, declared by statute, would be a violation of fundamental principles of justice in the relations of states to each other, and this, in a matter of such vital moment that it involves the means of life and the well-being of many thousands of people.

XV.

THE OWNERS OF LANDS BORDERING ON THE ARKANSAS RIVER IN KANSAS HAVE NO VESTED RIGHTS IN THE ARKANSAS RIVER WHICH COMPLAINANT AS *PARENS PATRIAE* CAN ASSERT AGAINST THE DEFENDANTS.

1. The complainant in this action has insisted with great earnestness that the Arkansas river is a "meandered stream." The Kansas brief says:

> "By the surveys of the government, made in 1867 and 1872, extending along the *whole length of the river in Kansas,* the banks of the river were meandered. At that time the United States owned the land along the Arkansas river, and it had the right to either meander the stream and call the river navigable, or to survey across it and sell the bed of the stream as land, if it deemed

the river to be in fact not navigable. The bed of the Arkansas between these meandered lines, established by these original surveys, has never been sold by the United States to any person, has never been conveyed by the United States for any purpose whatever. When the State of Kansas was admitted into the Union, the bed of the Arkansas river passed to the State of Kansas, and since that time the State of Kansas has never sold or pretended to convey any of the land between the meandered lines establishing the banks of the Arkansas river." (Pl. Br., 191.)

We have heretofore, in Division VIII of this argument, contended that the complainant could have no relief against the defendants by reason of alleged navigability of the Arkansas river in Kansas, unless it should appear that such navigability existed as a practical fact, and that the actions of the defendants had the effect of diminishing such navigability. But when the question comes as to riparian rights of the owners of land on either side of a meandered stream, a very different question arises. It will appear at once that riparian rights on a non-navigable stream are different in character and principle from those upon a navigable stream, a distinction which the complainant's counsel entirely ignore. On a non-navigable stream it is a well established proposition of law that lands which are bounded by the river extend to the middle of the stream, so that the owner of the adjacent riparian land owns by an equally good title the very soil over which the water flows; while along a navigable stream, or one which has been meandered

under the authority of the United States, in the manner suggested by counsel for the complainant, the limit of the ownership of the adjacent proprietor is at the meandered line, and he has no right or title to the soil under the water of the stream, which, as counsel very truly says, belongs to the state and not to the adjacent proprietor.

Now, one who owns to the middle of the stream has a property interest in the flow of the water over the land he so owns, but there is certainly no corresponding interest in the flow of the river by one who has no title to the underlying land. It would seem that the property interest in the nature of a riparian right to the flow of the stream is by most authorities (with some occasional difference of opinion) held to result from this ownership of the soil over which the water flows.

In *Angell on Watercourses*, 7th Ed., section 5, it is said:

> "The right of private property in a watercourse is derived as a corporeal right or hereditament, from, or is embraced by, the ownership of the soil over which it naturally passes."

And in a note it is said on the authority of Lord Holt,

> "That a river, of common right, belongs to the proprietors of the land between which it runs, to each that part nearest his land. This has been frequently, if not uniformly, adopted as the established rule. It is de-

rived mainly from the rule that the riparian proprietor is owner of the soil under the water, and by the general law of property becomes entitled as of right to all accessions." Id., 8.

Judge Story, when an associate justice of this court, but speaking on the circuit, said:

> "*Prima facie* every proprietor upon each bank of a river is entitled to the land, covered with water, in front of his bank, to the middle thread of the stream, or, as it is commonly expressed, *usque filum aquae.* In *virtue of this ownership* he has a right to the use of the water flowing over it in its natural current, without diminution or obstruction. But, strictly speaking, he has no property in the water itself; but a simple use of it, while it passes along."
>
> Tyler vs. Wilkinson et al., 4 Mason, 397, 400.

Now, the startling effect of this separation of titles upon the complainant's general contention will be apparent from authorities which it itself cites.

In the case of *La Plaisance Bay Harbor Co. vs. The City of Monroe* (1 Walker Ch. Mich., 155), the complainants, pursuant to charter authority, had erected a warehouse and pier on the margin of a channel of the river Raisin which runs into the bay, and had gone to a great deal of expense in connection with that work. Now, the city of Monroe, under authority of the legislature, was about to construct a canal

connecting the waters of the river Raisin with Lake Erie, and it was alleged that if this were permitted it would entirely cut off the water flow from the river to the bay and destroy the usefulness of the complainants' buildings and improvements. The Court of Chancery of the state of Michigan, upon full investigation, dissolved the injunction which the complainant had obtained, and the court says that the damage sustained by the complainant is *damnum absque injuria;* that it is an injury for which the law makes no compensation; that should the improvement of the defendants take away all business of the complainants' wharf, it would be the misfortune of the latter, but the defendants would be under no legal or moral obligation to make remuneration. In that case the complainants claimed a vested right, but this claim was not held to be tenable.

This court had occasion to remark in *Railroad Co. vs. Schurmeir,* 7 Wallace, 272, 289, in view of the consideration of the case, that congress in making the distinction between streams navigable and those *not* navigable, intended to provide that the common law rules of riparian ownership should apply to lands bordering on the *latter,* but that the title to lands bordering on navigable streams should stop at the stream.

In Iowa, where the riparian proprietor owned the fee of the soil to the ordinary high water mark, but did not hold the title to the middle of the stream, it was held that such proprietor had no right of compensation for land taken by a railroad company below high water mark, not even by reason of his being deprived of access to a navigable river, and the court says:

"The doctrine deducible from adjudged cases is, that by the rules of the common law the owner of land along the shore of a navigable river is entitled to *no right, either in its shores or waters,* as an incident of his ownership, except the contingent ones of *alluvion* and *derelictum.*"

Tomlin vs. Dubuque, B. & M. R. R. Co., 32 Iowa, 106, 109.

The Court of Appeals of the state of New York held, as stated in the syllabus, that the Mohawk river is a navigable stream; that the title to the bed of the river is in the people of the state, and that "riparian owners along the stream are not entitled to damages for any diversion or use of the waters of the Mohawk by the state."

The People vs. The Canal Appraisers, 33 N. Y., 461.

See, also:

People vs. Tibbetts, 19 N. Y., 523, 528.

Now, the principles set forth in these cases were applied by the Supreme Court of Kansas to the case of a river which, by the statute of the State of Kansas, had been declared a non-navigable river, the application being so made, however, because prior to that declaration the stream had been a meandered stream, and the title to the river bed had, therefore, passed to the state, and not to the owners of adjacent lands, with the result that the court held that what are commonly considered as riparian rights did not exist in

this case, and that a riparian proprietor had no title to the ice formed upon the stream.

> "The title to the soil being in the state, and the stream being a public highway, obviously the ownership of the ice would rest in the general public, or in the state as the representative of that public. The riparian proprietor would have no more title to the ice than he would to the fish. It simply is this, that his land joins the land of the state. The fact that it so joins, gives him no title to that land, *or to anything formed* or grown upon it, any more than it does to anything formed or grown or found upon the land of an individual neighbor."
>
> Wood vs. Fowler, 26 Kan., 682, 690.

The language last cited, pronounced by Judge Brewer, now a member of this court, would seem to be broad enough to exclude rights in the water out of which the ice was formed, and to say that all rights of the adjacent land owner terminated with his boundary.

The Nebraska Supreme Court applies the law as follows:

> "As to navigable streams the doctrine seems to be that the water, and the soil thereunder, belong to the state, and under its sovereignty and domain, in trust for the people, and can not, therefore, be the subject of a claim of property therein, *or the right to*

the use thereof by an adjoining land owner. When the government, in its survey, runs meander lines along the bank of a stream, and parts with its title to the adjoining land, the boundary of which would be high-water mark, then it would seem permissible to classify the stream as navigable, in which case the waters thereof and the bed thereunder would belong to the state, and be held by it in trust for the people. The waters in such streams would be held to be *publici juris,* and *not subject to riparian claims* by the adjoining land owner. *Shively vs. Bowlby,* 152 U. S., 1. *Illinois C. R. Co. vs. Illinois,* 146 U. S., 387. *Packer vs. Bird,* 137 U. S., 661. *Martin vs. Waddell,* 16 Pet., 367. *Pollard vs. Hagan,* 3 How., 212. *Richardson vs. United States,* 100 Fed., 714."

Crawford Co. vs. Hathaway, 93 N. W. Rep., 781, 789.

(S. C.) Crawford Co. vs. Hall, 60 L. R. A., 889, 901.

Now "vested rights," in the sense used by complainant, are rights which can not be taken away, except for public use upon compensation paid through due process of law. Subsequent statutes may not impair them, and even constitutions, subsequently adopted, can not take them away. It is, however, a well established proposition that no such rights exist in favor of one whose land is bounded at the edge of a navigable or meandered stream. The state may do as it pleases with its property, regardless of any rights of the adjacent land owner. It may itself di-

vert the entire stream, so that none of it shall flow by him, or it may authorize others to do so, and such land owner would have no right of action or ground of complaint which the law would recognize. Now, as we have already shown, Kansas has authorized the diversion of the waters of the Arkansas, and under the authorities above cited, riparian proprietors at Wichita (for example) would have no remedy as against a diversion of the waters of that stream for irrigation purposes at Garden City by the Amazon Irrigating Company.

Under such condition of the law and the facts of this case, we submit that the principles which we have discussed in the preceding division of this argument, as to the State of Kansas in its capacity as a private proprietor, apply with full force to the complainant in its capacity as *parens patriae*. It can not assert, as against the defendant, rights in its citizens which it does not recognize as existing by its own laws. It can not ask that the defendant, State of Colorado, shall yield to certain citizens of Kansas that which the State of Kansas itself refuses to those citizens, in a matter that is common to both states.

2. Entirely independent of the considerations set forth in the preceding section of this argument, it may be said that under the evidence produced in this cause, it is impossible to find any "vested right" in individual proprietors which is shown to have been injured in any degree by actions of the defendants, or any of them.

In a certain vague way complainant claims that the "State of Kansas" has a vested right in the system

of irrigation ditches in western Kansas, but the complainant's brief expressly says:

> "The State of Kansas is not defending any particular title, nor any single right connected with any particular piece of land. It is not attempting to establish the exact date of a particular priority, nor is it attempting to sustain the right of any individual or corporation to a particular amount of water that was used in any ditch for the purpose of irrigation. No such allegation as that is found in the bill, and no proof was introduced to sustain such a claim." (Pl. Br., 238.)

In the absence of both allegation and proof on this subject, this court surely can not find, as a matter of fact, that any "vested right" existed in any Kansas ditch owner which can here be asserted as against the defendants.

Aside from this matter of the western Kansas ditches the only attempt made to show vested interests in private citizens of Kansas in the Arkansas valley was by the introduction of complainant's Exhibit A-4, which is a communication from the acting commissioner of the general land office, addressed to counsel for the complainant, and purporting to give three hundred entries of lands bordering on the Arkansas river between *Hutchinson* and *Arkansas City* in the State of Kansas. The earliest date given in this exhibit is October 21st, 1870. There is no attempt in the evidence to show that any one of these three hundred tracts of land included in this communication has suffered a specific or any injury either by the

acts of the defendant, or otherwise. These lands are almost exclusively within that section of the state which counsel in a previous argument designate as the "humid region," where the river is "re-enforced by the Little Arkansas river, the Ninnescah river, the Walnut river and many minor streams." The western limit of the area covered by these entries is at the headwaters of what we have called the *Kansas* Arkansas. It is the lower part of the "broken river." Of these entries those nearest to Colorado are nearly three hundred miles away as measured by the river from the Colorado state line, and are separated therefrom at times of low water by the long stretch of dry, sandy river bed, which has been described at length in Division II of this argument as characterizing the river from the earliest times. It clearly is not sufficient for the complainant to merely show the entry of specific tracts of land bordering upon the river in this section of the state. It is further necessary, so far as such lands are concerned, to show that they have been injured, or that injury to them is threatened by reason of the acts of the defendants. There is no attempt at proof of such injury as to these specific lands, or any of them, and from the argument heretofore made we respectfully submit that it can not be found that any injury has been or will be inflicted on lands so situated from any facts proved as to general conditions affecting the Arkansas river, and the lands in the valley thereof.

XVI.

UNDER THE PRINCIPLES OF THE COMMON LAW WHICH HAVE RESULTED IN THE DOCTRINE OF "RIPARIAN RIGHTS," THE INHABITANTS OF ARID LANDS ALONG THE UPPER REACHES OF THE ARKANSAS RIVER HAVE A PRIOR RIGHT *EX JURE NATURAE* TO THE BENEFICIAL USE OF ITS WATER TO THE FULL EXTENT REQUIRED FOR THEIR ADEQUATE SUSTENANCE AND WELLFARE.

It appears to us that counsel for complainant, in fixing their eyes steadily upon the alleged riparian rights of the citizens of Kansas, have overlooked the riparian rights at common law of the inhabitants of Colorado who live along the Arkansas river. Under the authorities it is also clear that the complainant in its brief gives altogether too narrow a definition of "riparian rights" as they exist at common law.

We can not ask that the rights of Kansas or its people should be determined by the Constitution or statutes of Colorado, or by any peculiar customs which have grown up in Colorado alone since the creation of either the state or the territory of Colorado. On the other hand, the rights of the defendants in this action are not to be determined by any constitutional or statutory provisions or judicial decisions of the State of Kansas, and insofar as it may become necessary, in the determination of this cause, to solve legal questions as to the relative rights of the parties, we should seek, and, if possible, find some rule of decision which shall apply in common to both parties. The complainant contends that such rule of decision, binding alike on both parties, is found in the common

law. Without conceding the validity of this contention, it is, nevertheless, our duty to consider what conclusion should be reached, if such rule of decision should be adopted.

We confidently contend that the principles of the common law when properly applied furnish a complete defense to the defendants in this cause as against the contentions urged by Kansas.

1. Riparian rights at common law include the right to irrigate riparian lands.

The right of a riparian proprietor on the lower reaches of the stream to the continued and "undiminished" flow of the stream is subject to rights of upper riparian proprietors to certain uses of the stream, and, as we shall see further on in this discussion, those uses may some of them be of such a character as to entirely consume the stream. Without at present, however, referring to any such uses, we now simply call attention to the fact that the right to irrigate is one of the riparian rights recognized by the common law.

For the purpose of this case it might be sufficient to cite the latest Kansas authority. The Supreme Court of Kansas, in a case from which voluminous quotations are made in the Kansas brief, has said:

> "The authorities are unanimous to the effect that the use of water for *irrigation* is one of the *common law rights* of a riparian proprietor. 3 Farnham on Waters, 1895; 17 A. & E. Enc. of Law (2d Ed.), 487."
>
> Clark vs. Allaman, 80 Pac. Rep., 571, 584.

The same fact is recognized in a case on which *Clark vs. Allaman* heavily leans.

Crawford Co. vs. Hathaway (Neb.), 93 N. W. Rep., 781.

(S. C.) Crawford Co. vs. Hall (Neb.), 60 L. R. A., 889, 897.

In *humid* countries, where no question of the necessities of the people growing out of aridity of the soil could arise, this riparian right of irrigation has been recognized.

> "A man owning a close on an ancient brook may lawfully use the waters thereof for the purposes of husbandry, as watering his cattle, or irrigating the close; and he may do this either by dipping water from the brook, and pouring it upon his land, or by making small *sluices* for the same purpose; and if the owner of a close below is damaged thereby, it is *damnum absque injuria.*"
>
> Weston vs. Alden, 8 Mass., 135, 136.

See, also:

Anthony vs. Lapham, 5 Pick., 175.

Elliott vs. Fitchburg R. R. Co., 10 Cush., 191, 194.

In England it was said:

> "Streams of water are intended for the use and comfort of man; and it would be unreasonable, and contrary to the universal

sense of mankind, to debar every riparian proprietor from the application of the water to domestic, *agricultural* and manufacturing purposes, provided the use of it be made under the limitations which have been mentioned; and there will, no doubt, inevitably be, in the exercise of a perfect right to the use of the water, some evaporation and decrease of it, and some variations in the weight and velocity of the current. But *de minimis non curat lex*, and a right of the proprietor below would not necessarily flow from such consequences, but would depend upon the nature and extent of the complaint or injury, and the manner of using the water. * * * *It is entirely a question of degree,* and it is very difficult, indeed impossible, to define precisely the limits which separate the reasonable and permitted use of the stream from its wrongful application; but there is often no difficulty in deciding whether a particular case falls within permitted limits or not."

Embrey vs. Owen, 6 Exch., 353, 369, 371.

The case last cited, as many others which show that irrigation is a riparian right, makes limitations as to the extent of use, and the effect of a substantial diminution of the flow of the stream to lower proprietors. We are not here considering the question of the extent of such use, but only the fact that irrigation of the lands bordering on a stream is a recognized common law riparian right.

2. The common law, however, recognizes, even in a humid country, that there are certain necessary uses to which the riparian proprietor has a *natural right* to apply the waters of the stream without regard to the effect of such use upon proprietors below.

> "By the general law applicable to running streams, every riparian proprietor has a right to what may be called the ordinary use of the water flowing past his land; for instance, to the reasonable use of the water for his domestic purposes and for *his cattle*, and this without regard to the effect which such use may have, in case of a deficiency, upon proprietors lower down the stream."
>
> Miner vs. Gilmour, 12 Moore P. C., 131, 156.

Lord Romilly says:

> "As to riparian proprietors there is no question, I think, about the law upon the subject * * * that a riparian proprietor has the paramount right to take what water he likes from the river for usual domestic purposes. I do not say how widely the term 'domestic purposes' may extend. Unquestionably it would extend to culinary purposes and to purposes of cleansing, washing, the feeding and supplying of an ordinary quantity of cattle, and so on."
>
> Attorney-General vs. Great Eastern Ry. Co., 23 Law Times, N. S., 344.

The Supreme Court of Alabama, after citing various authorities, says:

> "If these numerous citations settle anything, they certainly establish, at least, the following propositions: 1. That each riparian proprietor has the right to use the water which flows from or through his lands for all ordinary purposes, and for the *gratification of natural wants,* even though in such use he consumes the entire stream."

Stein vs. Burden, 29 Ala., 127, 132, 133.

In Kentucky it is said:

> "The primary use of water is for natural and domestic purposes, and each proprietor of land through which it flows may use as much of it as is necessary for those purposes, even if it be entirely consumed in the use; but he is limited as regards *other* purposes to a reasonable and proportionate use, which must not be such as to exclude others from a benefit to which they are equally entitled with himself." (Citing various authorities.)

Anderson vs. Cincinnati So. Ry., 86 Ky., 44, 49.

See, also:

Hazeltine vs. Case, 46 Wis., 391, 394.

Evans vs. Merriweather, 3 Scam. (Ill.), 492, 496.

Wadsworth vs. Tillotson, 15 Conn., 366.
Rhodes vs. Whitehead, 27 Tex., 304, 310.
30 A. & E. Enc. of Law, 2d Ed. (b), page 358, and authorities cited in Note 1, page 359.

The common law, therefore, clearly recognizes that in a *humid* country there are certain natural rights of use of water which may be exercised, even to such extent as to entirely consume the stream, and leave none to flow to the proprietors below. As to the exercise of such rights, the riparian proprietor on the upper reaches of the stream has, *ex jure naturae*, superiority over the lower proprietor. This primary natural right, which the common law so recognizes, is by the express letter of the decisions extended to what may be called husbandry, as manifested in the care of cattle, and this is but indirectly saying that this natural right extends to those uses upon which depends the subsistence of the people who live along the stream.

The common law thus recognizing in humid countries certain necessary uses of humanity, which will permit an upper riparian proprietor in case of need to consume the whole stream without regard to the rights of those below him, the question arises as to whether this principle is confined within the same limits in a country where conditions are different, and where, for the subsistence of the people, *necessary* uses cover a larger scope.

3. Is irrigation of arid lands a necessary use, or is it to rank only as a convenience?

To hold that under given conditions the natural wants of man may justify him in diverting a watercourse for the irrigation of his arid lands is not a departure from the common law. It is a question of the proper application of the principles of the common law. The common law recognizes clearly the right to irrigate as a riparian right. The question of the rank of that right as compared with other uses is a question to be determined by circumstances and conditions, and the necessities of humanity. The common law, by its very nature, and the principles which compose it, looks to these special circumstances to determine the scope and limitation of a general rule when applied to a particular case. Many authorities say that in America we have adopted the common law of England, only so far as it is suited to the conditions and wants of our people, even though the expressed letter of the statutory adoption may be more strongly expressed. All such statements of the rule sustain also the doctrine that in construing the common law as to its application, we should, within the reasonable limits of the general principles involved, be guided by the conditions and wants of the people.

This court, speaking through Mr. Justice Story, says:

> "The common law of England is not to be taken, in all respects, to be that of America. Our ancestors brought with them its general principles, and claimed it as their birthright; but they brought with them and

adopted only that portion which was applicable to their situation."

And in presenting some reasons for a construction of common-law rights, Justice Story says:

"The country was a wilderness, and the universal policy was to procure *its cultivation and improvement.*"

Van Ness vs. Pacard, 2 Peters, 137, 144, 145.

See, also:

Wheaton et al. vs. Peters et al., 8 Peters, 591, 659.

The Supreme Court of Pennsylvania says:

"Certainly the principles of equity are part of our common law. It is the very essence of common or customary law that it consists of those principles and forms which grow out of the customs and habits of the people. It is, therefore, involved in its very nature that only so much of the English law as is adapted to our circumstances and customs is properly recognized as part of our common law. This same principle is most emphatically involved in the cardinal maxim of all common law, *cessante ratione legis, cessat et ipsa lex.*"

Pennock's Estate, 20 Pa. St., 268, 274.

See also:

People vs. The Canal Appraisers, 33 N. Y., 461, 468.

In the case last cited the court suggests that if the common law of England has been adopted, "it has been in a form modified and improved to fit the conditions of the country and the wants of its inhabitants."

In Indiana it has been said of the statute of that state adopting the common law:

> "Under this enactment, it has been repeatedly held that when our circumstances are materially different from those of England, so as to make any of the rules of the common law inappropriate, the courts will make such modifications as our condition requires."
>
> Dawson vs. Coffman, 28 Ind., 220, 223, 224.

See also:

> Penny vs. Little, 4 Ill., 301, 304, 305.

Citations of like character might be greatly multiplied, and from them the necessary conclusion is to be deduced that in applying the principles of the common law it shall be done with such modifications as may be required by the conditions and wants of the people.

In view of the condition and wants of the people of the arid section of the United States, the use of water in the irrigation of lands takes the rank of a necessary use, affected by the same rules as apply to other necessary uses of humanity as recognized by the common law.

The fact that the use of water from natural streams for the irrigation of arid lands *is* necessary

to the sustenance of the people occupying those lands, or that shall hereafter occupy them, is undeniable. It is a fact of which this court has judicial notice, arising as it does from natural physical conditions affecting territory within the court's jurisdiction. The record in this case, however, gives the evidence of many witnesses introduced by the United States government, who have set forth the character of the arid lands, the scope of country which they include (nearly one-half of the United States), the impossibility that any degree of civilized life can be maintained upon those lands without irrigation, the established fact that with irrigation they may support a population of many millions, and the fact that on lands already irrigated, desert and uninhabited wastes have become rich and productive districts furnishing sustenance to a large population. It appears from this evidence, also, relating to the present conditions in the Arkansas valley in Colorado, that there is now a population of about 175,000 people that are dependent upon the irrigation of the arid lands along that stream; that large towns have grown up; great industries have become established; millions of property are involved. If these people may not be permitted to use the waters of the Arkansas river for purposes of irrigation of such arid lands, this would mean the destruction of industries, the desolation of extensive and populous agricultural districts, the taking away from the people of their means of subsistence, with the necessary effect of driving the people themselves out of the territory so occupied. These would be inevitable consequences, as shown by the evidence in this record, and as already elaborated in

this argument, if the waters of the Arkansas river may not be used for the irrigation of the adjacent lands.

These facts show in the very strongest way the absolute *necessity* of the use of the waters of the stream upon arid lands. This use certainly, under such circumstances, becomes even of a higher rank as a necessary use than is the "watering of cattle." There is, indeed, nowhere in the history of the common law, or of the application of the rules of riparian rights to the affairs of men, a case where a *"necessary use"* is so marked and prominent as is this necessary use. Permitted, it means a great population of prosperous people. Denied, it means that a large part of the area of the United States must always remain an arid waste.

The fact of this necessity has repeatedly received judicial and statutory recognition.

Long ago the Supreme Court of the state of Illinois, in discussing the reasonable uses of running water by an upper proprietor, used this language:

> "Now the question fairly arises, is that a reasonable use of running water by the upper proprietor, by which the fluid itself is entirely consumed? To answer this question satisfactorily, it is proper to consider the wants of man in regard to the element of water. These wants are either natural or artificial. Natural are such as are absolutely necessary to be supplied, in order to his existence. Artificial, such only, as by supplying them, his comfort and prosperity are in-

creased. To quench thirst, and for household purposes, water is absolutely indispensable. In civilized life, water for cattle is also necessary. These wants must be supplied, or both man and beast will perish. The supply of man's artificial wants is not essential to his existence; it is not indispensable; he could live if water was not employed in irrigating lands, or in propelling his machinery. *In countries differently situated from ours, with a hot and arid climate, water doubtless is absolutely indispensable to the cultivation of the soil, and in them, water for irrigation would be a natural want.*"

Evans vs. Merriweather, 3 Scam. (Ill.), 492, 495.

Judge Hallett more than thirty years ago, and in the territorial days of Colorado, said:

"The principles of the law are undoubtedly of universal application, but some latitude of construction must be allowed to meet the various conditions of life in different countries. The principles of the decalogue may be applied to the conduct of men in every country and clime, but rules respecting the tenure of property must yield to the physical laws of nature whenever such laws exert a controlling influence. In a dry and thirsty land it is necessary to divert the waters of streams from their natural channels in order to obtain the fruits of the soil, and

this necessity is so universal and imperious that it claims recognition of the law."

Yunker vs. Nichols, 1 Colo., 551, 553.

Now, in the closing days of his long and distinguished career on the federal bench, Judge Hallett, as quoted in the complainant's brief, speaks in a similar vein, and says:

"Water is essential to human life in the same degree as light and air, and no bounds can be set to its use for supplying the natural wants of men other than the mighty barriers which the Creator has made on the face of the earth." (Pl. Br., 248.)

The Supreme Court of Texas says:

"It may be admitted that the purpose of irrigation is one of the *natural uses,* such as thirst of people and cattle, and household purposes, which must absolutely be supplied; the appropriation of the water for this purpose would, therefore, afford no ground of complaint by the lower proprietors, if it were entirely consumed."

Rhodes vs. Whitehead, 27 Tex., 304, 310.

That court again says:

"It seems to be the rule of the common law that a riparian owner has no right to use the water of the stream for irrigating his lands, provided it interferes with the uses of

the water by those who own the lands upon the stream below. That this is a proper rule in England and in those states where the rainfall is sufficient for the purposes of agriculture we freely concede, but we are of opinion that in those sections where irrigation is necessary to the successful pursuit of farming it should not apply. What is not a necessary use in the one case becomes necessary in the other. (Citing authorities.) * * *

"We think it a matter of common knowledge that there are portions of our state where the business of agriculture can not be successfully prosecuted through successive years except by irrigation, and it is to be inferred from the allegations of the petition that the section where the stream in controversy is situated is of that character. We think, therefore, that the defendants had the right to divert the water which flowed in the stream along or through their lands for the purpose of irrigating them, although the effect of such use was to leave the plaintiff corporation an insufficient supply for the same purpose."

Irrigation, etc., Co. vs. Vivian, 74 Tex., 170, 174.

This court has recently said:

"The rights of a *riparian owner* in and to the use of the water flowing by his land are not the same in the arid and mountainous states of the West that they are in the states of the East."

And after speaking of the constitutions and statutes adopted in certain western states, as necessitated by local conditions, it is further said:

> "This court must recognize the difference of climate and soil which render *necessary* these different laws in the states so situated."
>
> Clark vs. Nash, 198 U. S., 361, 370.

The riparian right at common law to use the water of the stream for industrial purposes has always been recognized, this right, however, being subservient to rights for domestic uses and to supply the natural wants of men. Now it is an interesting and somewhat important fact that the States of Kansas and Colorado fix the relative rank of the several uses of water in substantially the same way. In the amended bill of complaint it is correctly recited that the Constitution of the State of Colorado provides that "when the waters of any natural stream are not sufficient for the service of all, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have the preference over those using the same for manufacturing purposes." Constitution Colorado, article XV, section 6. (Record, page 70.)

We have already called attention to the fact that Kansas provides that all its waters, whether standing or running, and surface or subterranean, west of the 99th meridian, shall be devoted *"first,* to purposes of irrigating in aid of agriculture, subject to ordinary domestic uses, and, secondly, to other in-

dustrial purposes." Both states alike recognize the very great importance of the use of water for purposes of agriculture.

The congress of the United States, appreciating that nearly one-half of the national domain consists of arid lands, which can be utilized for occupancy only by free use of waters from flowing streams, recognized this necessity for such use in numerous acts, some of which are set forth in the answer of the defendant, State of Colorado (Record, pages 93, 94), and of which this court will take judicial notice. At the present stage of this discussion we call attention to those acts, commencing with the act of July 26, 1866, and coming down to the Reclamation Act of June 17, 1902, simply for the purpose of showing the recognition by the legislative department of the government, of the conditions which make the arid portion of our country different from the humid portion, and which require a wider scope for necessary natural uses, than would be the case in a region of abundant rainfall.

U. S. vs. Rio Grande Irrigation Co., 174 U. S., 690.

Gutierres vs. Albuquerque Land Co., 188 U. S., 545.

4. Within the permitted limits of use, the upper proprietor, by virtue of his position on the stream, has the first right to the use of its waters.

It would seem that it has become established law that the basis for the riparian right is found in nature. That right is held to be not an easement or appurtenance, but a property right, arising as a result of natural conditions.

In a case that has already been cited on both sides of this controversy, it was said:

> "It has been now settled that the right to the enjoyment of a natural stream of water on the surface, *ex jure naturae,* belongs to the proprietor of the adjoining lands, as a natural incident to the right of the soil itself, and that he is entitled to the benefit of it, as he is to all the other natural advantages belonging to the land of which he is the owner."
>
> Chasemore vs. Richards, 7 H. L. Cas., 349, 382.

As this entire right flows from natural conditions, coupled with the necessities of men, and as water flows down hill, it is very manifest that whatever riparian rights do in fact exist may be first enjoyed by the upper proprietor to whom the waters first come, and who can not again have the benefit of them after they have passed him. The natural rights, therefore, in the absence of any question of prescription or statutory law, pertain first to him upon the upper reaches of the stream. This is in strict accordance with the common law. To the extent that any riparian proprietor can enjoy the waters of the stream, the upper proprietor has priority of right by reason of his superiority of position.

This right, resulting from natural advantages of position, is constantly recognized in the authorities, even when not directly expressed.

In the case of *Roberts vs. Richards* (50 L. J. N. S., 297), a lower proprietor who had for seventy years

had almost the exclusive enjoyment of a water course, was held not to have the right to prevent an upper riparian proprietor from appropriating nearly all of the water for the use of newly built houses upon his premises.

The Texas Court of Appeals has said:

"A lower proprietor can not complain that one above uses the water of a stream for ordinary purposes, even though the water is thus exhausted."

Barrett vs. Metcalfe, 33 S. W. Rep., 759.

See, also, application of the same rule:

Irrigation, Etc., Co. vs. Vivian, 74 Tex., 170.

In Massachusetts it is said:

"So the natural right of the plaintiff to have the water descend to him in its pure state, fit to be used for the various purposes to which he may have occasion to apply it, must yield to the equal right in those who happen *to be above him.* Their use of the stream for mill purposes, for irrigation, watering cattle, and the manifold purposes for which they may lawfully use it, will tend to render the water more or less impure. Cultivating and fertilizing the lands bordering on the stream, their occupation by farm-houses and other erections, will unavoidably cause impurities to be carried into the

stream. As the lands are subdivided and their occupation and use become multifarious, these causes will be rendered more operative, and their effects more perceptible. The water may thus be rendered unfit for many uses for which it had before been suitable; but so far as that condition results only from reasonable use of the stream in accordance with the common right, the lower riparian proprietor has no remedy."

Merrifield vs. Worcester, 110 Mass., 216, 219.

In Pennsylvania, in a case where a lower proprietor was complaining of an upper proprietor, on account of the pollution of waters of the stream by the operations of coal mines of the upper proprietor, the court said:

"The water as it is poured into Meadow brook, is the water which the mine naturally discharges; its impurity arises from natural, not artificial causes. The mine can not, of course, be operated elsewhere than where the coal is naturally found, and the discharge is a necessary incident to the mining of it."

And speaking of the rights of a man to the use of his property, the court continues:

"If, in the excavation of his land, he should uncover a spring of water, salt or fresh, acidulated or sweet, he will certainly not be obliged to cover it again, or to con-

duct it out of its course, lest the stream, in its natural flow, may reach his neighbor's land. It has always been considered that land on a lower level owes a natural servitude to that on a higher level, in respect of receiving without claim for compensation by the owner, the water naturally flowing down to it. In sinking his well, he may intercept and appropriate the water which supplies his neighbor's well. * * * He may, to a reasonable extent, *jure naturae,* divert water from a stream for domestic purposes, and for the irrigation of his land."

Penn. Coal Co. vs. Sanderson, 113 Pa. St., 126, 145.

These cases will serve to illustrate the application of the rule we are here invoking.

5. What are the lateral limits of the riparian right of irrigation?

We think it may be safely said that the common law does not fix any specific limit, measured away from the stream, as bounding the riparian right. The one boundary of the lands involved is at or under the flowing water of the stream. The other boundary is left unsettled by any general rule. And it seems to be universally held that the extent away from the stream to which the right will reach must be determined by the circumstances and conditions affecting each particular case.

In the discussion of this query we do not propose to seek for a universal rule—it can not be found—but to consider the question in view of the character

and relation of parties, the nature and objects of the suit, and the character of the physical conditions out of which this action grows.

It is very apparent that the lateral extent of the riparian right can not, in this case, be determined by any extent of private ownership of specific tracts of land bordering the Arkansas river. This is not a controversy between private riparian proprietors along the stream whose rights may be measured by the ownership of their several specific tracts of land. The controversy relates to a river more than 1,400 miles in length, and of that total length the complainant is asserting interests for 350 miles of the river's course, and admits that the defendant, State of Colorado, has interests affecting 357 miles along the stream. The drainage area of this river is 20,000 square miles in Kansas; it is 26,000 square miles in Colorado. That portion of this immense territory which can fairly be called "valley," includes many hundred square miles in each of these two states. The sole complainant is the State of Kansas. The principal defendant is the State of Colorado.

In the utter absence of any data from which any fixed limit may be established which will reach *all* riparian proprietors, we submit that in this case the maximum possible limit, in due consideration of natural boundaries, is the only limit that can be considered. Assuming (for the purpose of the argument, as heretofore) that this case is governed by the common law, we submit that in view of the character of the parties, and of the subject-matter, and of the relief sought, we should consider this question of lateral extent of riparian right as if the *ownership* of all the

territory affected were divided between two adversary parties. A owns all of the land within the drainage of the river in Colorado. B owns all of the land in Kansas, through which this river runs. Now, with such an assumed solidarity of ownership on the respective sides of the state line, what would the principles of the common law fix as the lateral extent to which the water might be utilized by A for any necessary purpose of irrigation? Here, we suggest, those terse words already quoted by the complainant and ourselves from Judge Hallett, apply with special significance:

> "Water is essential to human life in the same degree as light and air, and no bounds can be set to its use for supplying the natural wants of men *other than the mighty barriers* which the creator has made on the face of the earth."

Insofar as the rights of parties are to be controlled by the principles of the common law, as applied between private proprietors, it may well be argued that the waters of the stream may not be taken beyond the drainage of the stream; that this would be to violate and overturn the natural conditions which have determined the course of the stream; that such diversion would mean a permanent loss to the stream, and to all riparian proprietors below.

But if the right be confined in its exercise to the land which drains into the stream, then as water will still continue to flow, and will always seek a lower level, all surplus, all waste, all seepage waters find their way back again to the common channel, and

take their course down the stream for the benefit of the lower riparian proprietors.

Natural conditions will, in themselves, so far as the question of irrigation is concerned, greatly restrict, within these outer barriers, the area of possible beneficial use of the waters of the stream for irrigation. The ~~surplus~~ surface of the lands must be sufficiently near a level plane to permit the fair utilization of water for its improvement. These natural conditions have the necessary effect of confining the particular area subject to irrigation to what may strictly be called the valley of the stream, as distinct from those elevated and inclined portions which would be incapable of yielding beneficial returns from the use of water.

We submit that the only limit which, under the rules of the common law, can in a case such as this between such parties as are now before the court be imposed as the lateral extent of the riparian right, is this limit of beneficial use within the area which is naturally drained by the stream.

The principle for which we here contend seems to be recognized by the courts of the leading state, where, as in Kansas, the common law prevails, and yet, where, as also in Kansas, there are both humid and arid sections.

In California we find the lateral limit fixed in various decisions. The California Supreme Court accepted a decision of the lower court fixing the watershed of the stream as the limit beyond which the riparian right would not extend.

Chauvet vs. Hill, 93 Cal., 407, 410.

In a later case the Supreme Court of California said:

> "The rule of the common law as to riparian rights in its extreme rigor has not been found to be adapted to the conditions existing in this state. At common law the riparian owner was limited in the use of the water of a stream to domestic purposes, and watering stock, and might utilize it for power. We have added to these purposes that of reasonable use for irrigation (*Gould vs. Stafford,* 77 Cal., 66, and other cases); but we are not aware that it has ever been held that water could be taken entirely away from the water-shed for any of these purposes under the claim of riparian right. * * * We think the rule should be that under the claim alone of riparian right, the owner of the land can not to the injury of another riparian owner, take the water beyond the natural water-shed of the stream for any purpose, and that riparian rights can not extend beyond the water-shed of the stream, and that lands so situated are not to be regarded as riparian."
>
> Bathgate vs. Irvine, 126 Cal., 135, 142, 143.

We think the Supreme Court of California, in the quotation above made, is in error as to the common law limitations as to the use of water, as will appear from the citations we have already made in this division of our argument, but the error is not material to the point we are now discussing.

The same rule is applied in the very recent case of *So. Cal. Inv. Co. vs. Wilshire,* 144 Cal., 68.

The Supreme Court of Kansas in the case already cited seems to adopt the very rule which we are here discussing. And in so doing expresses it affirmatively, and not negatively, as in the California cases above cited. That court speaks as follows:

> "In 3 Farnham on Waters, 1903, it is said: 'All conceptions of riparian land lead to the conclusion that it is land which is tributary to and lying along a watercourse, and as soon as the "divide" is passed and the water-shed of another stream is reached, the land can not be regarded as riparian with reference to the former stream, and since the right to land depends upon the land being riparian, the destruction of the riparian character destroys the right to irrigate.' *Within these limits* the principles of equality of right announced above *should control* the use of water for irrigation purposes by those whose land is affected by the presence of the stream, irrespective of the incidental matter of governmental subdivision of the land."
>
> Clark vs. Allaman, 80 Pac. Rep., 571, 585.

In view of the character of the parties, and the nature of this controversy, and in the light of the authorities cited in this division of our argument, we respectfully insist that if the common law is to furnish the rule by which this controversy is to be deter-

mined, the complainant must fail in its action. Any uses of the water proved to have existed in Colorado are uses recognized by the common law. They are uses which, under the conditions affecting the territory involved, rank as necessary uses. The right complained of has been exercised by upper proprietors, who, by natural position, have the first right to make such use of the waters, and those waters have been used within limits and for purposes fully sanctioned by the common law.

XVII.

UNDER THE COMMON LAW AS IT EXISTS IN KANSAS, THE RIPARIAN RIGHTS ALONG THE ARKANSAS RIVER IN KANSAS ARE SUBORDINATE TO LIKE RIPARIAN RIGHTS IN COLORADO.

Every contention which we have made in the last Division of this argument as to riparian rights under the common law, applies to that law as it now exists and has always existed in Kansas.

The Kansas brief says: "It must be also admitted that prior to 1868 the rule of the common law as to riparian rights in Kansas prevailed in all its vigor, and without any qualifications whatever." (Pl. Br., 209.) We do not consider that under the facts of this case it is very material as to what the "vigor" of the common law in Kansas was prior to 1868, and yet, the contention made in the above quotation is *not* admitted. While the Acts of 1855, 1859 and 1862 adopting the common law did not in terms contain an exception as to the effect of new conditions and

wants of the people, yet, on the principles and under the authorities we have already discussed, such limitation was necessarily involved in the adoption of the common law, and that fact was recognized by the Supreme Court of Kansas as early as 1863, when, in construing these very acts of adoption, the court said:

> "We have adopted no more of the common law in this state than is *adapted to our situation,* and applicable to our institutions."
>
> The State, ex rel Adams vs. Hillyer, 2 Kan., 17, 27.

In 1868, however, a new statute as to adoption of the common law was enacted, which expressly provided that it was the common law as modified by "the conditions and wants of the people," that should remain in force in aid of the general statutes of the state. From the earliest times, therefore, Kansas has recognized the principle for which we have contended, that the common law in that state was to be construed in accordance with the situation of the people, and their needs. As to the people within the jurisdiction of the State of Kansas, the construction which the court of last resort in that state has given or shall give to this modifying limitation in the adoption of the common law, is, of course, conclusive, but it is not conclusive upon the State of Colorado or its inhabitants. The defendants in this action can properly demand that the common law as in existence in Kansas, so far as it is to measure the rights of persons beyond the jurisdiction of Kansas, shall be

determined anew and without regard to the opinions of the Supreme Court of Kansas as to specific facts or conditions.

But it seems to us that we do not need to go into the early history of either Kansas or Colorado for the purpose of sustaining the proposition which we are now discussing. The latest utterance of the Supreme Court of the State of Kansas on the subject, has the effect of sustaining the contention we are here making.

We ask the attention of the court again, and with some particularity, to the case of *Clark vs. Allaman* (80 Pac. Rep., 571), upon which the complainant so greatly relies. Of this case the Kansas brief says:

> "The question of the adoption, the extent, the nature, and the limitations of the common law doctrine of riparian rights was there in issue. The case was fully argued, and the opinion of the court, rendered by Mr. Justice Burch, is of great importance, and *will be of great assistance in the decision of the case at bar.*" (Pl. Br., 196.)

In order that credit may be given where credit is due, we would suggest that the Supreme Court of Kansas, in coming to its conclusion in that case, had the valuable assistance, as *amici curiae,* of the honorable attorney-general of the State of Kansas and of all the other solicitors of the present complainant. (80 Pac. Rep., 572.)

The case involved a controversy between irrigators. It did not involve any asserted right for any use except that of irrigation. The case related to an

oasis in the western part of Kansas, where Nature "as if relenting from her severity toward the semi-arid plains of Wallace county, where atmosphere and soil are parched in almost continuous drought, * * * has caused a number of springs of pure and wholesome water to break forth from the bosom of the earth and form the unfailing stream of Rose creek. Here wild things came in the early days to slake their thirst. Here the hunter of the bison and wild horse lay in wait, and here the irrigation farmer came to practice agriculture." (Page 572.)

The facts involved in that case are material to our inquiry, but may be stated in condensed form. Rose creek, formed by the confluence of what were the west and south branches, is a perennial stream which runs for five miles below that confluence, and "empties upon the sands of the bed of the Smoky Hill river, *usually dry,* except in flood seasons of the year." (As the place referred to where the Smoky Hill river is "usually dry," and where the region is one "of almost continuous drought" has about the same longitude as Syracuse on the Arkansas, and is only about seventy miles north of the Arkansas, this physical condition is somewhat significant, in view of the controversy as to facts in our present case.)

Rose creek after it reaches the Smoky Hill river, furnishes water which continues down the channel of that stream for some distance, and the plaintiff's predecessor in interest had established a dam in the Smoky Hill river, below the junction with Rose creek, and with that dam captured the waters which came down from Rose creek into the Smoky Hill river, and used them for irrigation upon the lands which were riparian to the Smoky Hill river.

"The channel of the Smoky Hill river traverses a part of" the plaintiff's quarter section. By means of this diversion of the water Mrs. Allaman, the plaintiff, and her predecessor had, since 1875, applied the water to the irrigation of land, increasing from year to year the acreage irrigated "until it is now probably eighty acres in extent, and furnishes a striking example of the magical transformation produced by the application of water to desert soil. Land otherwise fit for pasture only, and worth not more than $2.50 per acre for that purpose, has been turned into orchard, garden and meadow, regularly supports a growth of annual crops, and is worth $100.00 per acre." (Page 573.)

Other proprietors along Rose creek and its branches also utilize the flowing waters of the stream for purposes of irrigation. No trouble arose until the period of drought. "The years of 1900 and 1901 were excessively dry." (Page 573.) [See our argument as to Kansas Ditches, *supra*, page 198.] In the resultant controversy between the various parties using the water for irrigation, the trial court adopted the rule of priority of appropriation, with the result of giving to Mrs. Allaman, the plaintiff, but the one farthest down the stream, certain rights superior to those further up the stream, whose rights were junior in time. The Supreme Court reverses the judgment of the court below, applies the common law as the court construes that law, and gives superiority of right to the *upper* riparian proprietor. All the rights involved in that case had originated prior to the statute of 1886, in reference to appropriations of water, and none of the parties had attempted to comply with the

statutory provisions relating to the appropriation of water.

Now, the court, in applying the common law to these conditions, has held, as we have already noted, that the authorities are unanimous to the effect that the use of water for irrigation is one of the common law rights of a riparian proprietor. (Page 584.) The court adopts from Chief Justice Shaw language such as this:

> "So long as it is not wholly obstructed or diverted, or no larger appropriation of the water running through it is made than a just and reasonable use, it can not be said to be wrongful or injurious to a proprietor lower down. * * * That a portion of the water of a stream may be used for the purpose of irrigating land we think is well established as one of the rights of the proprietors of the soil along or through which it passes." (Page 584.)

The court, after holding, as we have already mentioned, that the lateral limitation in the use of the water is to be considered "irrespective of the incidental matter of governmental subdivisions of the land," further says that the riparian proprietor is "entitled to the rights of such, without regard to the extent of his land, or from whom or when he acquired his title. The fact that he may have procured the particular tract washed by the stream at one time, and subsequently purchased land adjoining it, will not make him any the less a riparian proprietor, nor

should it alone be a valid objection to his using the water on the land last acquired." (Page 585.)

Speaking of a contention as to a prescriptive right on the part of Mrs. Allaman, the court says:

> "Her acceptance and use of the water flowing down Rose creek to her land involved the exercise of the right which she herself possessed without encroachment upon the rights of the upper proprietors, and they lost all property in the water *when it left their land.* Hence her conduct lacked the adversary quality necessary to the foundation of prescriptive rights." (Citing authorities.) (Page 585.)

Referring further to the facts of that case, and to the uses of water from Rose creek by upper riparian proprietors, whose use was initiated subsequent to that of the plaintiff, the court says:

> "Titles to other lands along the course of Rose creek were acquired by various persons on subsequent dates, and, following the earliest efforts at irrigation already described, other dams and ditches were established, known as the Grant and Weisgerber, the Kyner, and the Williams plants. Altogether the waters of Rose creek *now* irrigate 300 acres of land in a semi-arid region, otherwise incapable of sustaining successful agriculture. As the area under cultivation was extended year by year, an amount of water correspondingly larger was *necessarily* di-

verted from Rose creek *and consumed.*" (Page 573.)

The flow of the stream at its mouth was about five cubic feet per second of time. (Page 572.)

We have, then, here an irrigation case turning upon what the court construes to be the common law riparian rights, in which it is held that the upper riparian proprietor has the right to use the water to irrigate his lands, however extensive those lands may be, the only limit being the divide that separates the drainage from the next stream. (Page 585.) The court holds that such use is a reasonable use, authorized by law, even though in a time of drought it consumes the entire stream, leaving none to flow to the lands below, and that the riparian right of the lower proprietor is only such as she can enjoy without encroachment upon these rights of the upper proprietors. Her "vested rights" in the flow of the stream are held to be subject to the later rights of the upper proprietor, who has the advantage of position on the stream.

The only point for which we have contended in the preceding division of this argument that is not covered by this case in strict accordance with our contention, is the relative rank which should be ascribed to irrigation as compared with other uses, and, inasmuch as that was an irrigation case where both parties were claiming for the same purpose, such a question could not arise. In this connection, however, we call attention to the fact that in the case at bar the uses in Colorado and Kansas which are the subject of inquiry are uses of the same rank in any event. The uses for which Kansas claims the

water are agricultural uses, except, indeed, as to the Arkansas City power plant, and the use for power is to-day, at least, if it has not always been, a use that takes inferior rank to that of agriculture.

May we not fairly claim—in fact, is not the conclusion irresistible—that if we apply to our present case the common law as it has been announced in Kansas, then Kansas has no right to the flow of the Arkansas river into and through her state, except *subject* to the reasonable use of the waters of that stream in Colorado for the purpose of irrigation of arid riparian lands, and that the extent of those riparian lands laterally away from the river has no fixed limit other than the divide which separates the drainage of the Arkansas from the drainage of other rivers? Under the common law, it is, of course, true that the uses of the water by the upper riparian proprietor must not be in excess of his needs, nor be wasteful in character, nor such as to divert the stream into a different drainage, which would prevent the return of the surplus waters to the original stream. But no such excessive or wasteful use is shown in this case. We have heretofore discussed the methods of diversion and storage of the water of the Arkansas in Colorado, as not only avoiding all injury to Kansas, but as being such as to confer absolute benefits upon the western part of that state. (*Supra,* page 209.) And we have called attention (*supra,* page 134) to the views of Professor Elwood Mead, as to our methods of diversion and use. He says:

> "I believe that, taking everything into consideration, the system that has been developed by Colorado for the distribution of

> the waters of the Arkansas river is among the best to be found in the United States. It represents in many respects the most advanced work that has been done in that direction." (1376.)

The waters of the Arkansas in Colorado are not diverted from the drainage of that stream. No wasteful or extravagant use of these waters in Colorado to the injury of the common law rights of riparian proprietors in Kansas can possibly be claimed.

XVIII.

KANSAS CAN HAVE NO RELIEF IN THIS ACTION AS ARISING FROM THE PRINCIPLE THAT HE IS PRIOR IN RIGHT WHO IS PRIOR IN TIME.

The complainant repudiates as not controlling it the doctrine which prevails in Colorado, and in most of the arid portion of the United States, that the waters of the streams may be appropriated and applied to beneficial uses upon the land, and that relative rights shall be determined by priority of time of appropriation and use, without regard to location along the stream.

When analyzed it would seem that the only basis upon which Kansas claims, or can claim, priority of right, by reason of priority of time, is that the movement of population having been from the east to the west, the lands along the Arkansas valley in eastern Kansas were taken into private ownership at an earlier date than were lands along the Arkansas

in Colorado. There is no attempt on the part of the complainant to establish such priority of right by reason of any beneficial utilization of the waters of the Arkansas river, either in eastern or western Kansas, in those early days. The contention is based wholly upon the proposition that a man whose land bordered the stream, if he acquired that land, say in 1870, obtained a vested right to the continued and undiminished and unimpaired flow of the stream as against all other persons further up the stream, who at a later date than 1870 had settled upon such upper lands.

This contention is absolutely untenable, in view of the settled principles of the common law, and in view of the Kansas construction of the common law, which we have discussed in the last division of this argument. Any "vested right" of the lower proprietor whenever it was obtained was always subject at common law to a corresponding right in the upper proprietor, and to corresponding rights in *all* upper proprietors, however numerous they might become. And the upper proprietor had, as we have shown, the additional advantage, growing out of his position, that for those uses which should be called *necessary* he could lawfully consume the entire stream if his needs so required. It was only after the reasonable exercise of the rights of upper proprietors that the lower proprietor had, under the vested right principle, anything which he could claim as his own. The effect of this fact has frequently been such as to entirely destroy the benefits of the flow of a stream for a lower proprietor. When the upper reaches of the stream ran through uninhabited territory, with none to use the waters that were flowing, the stream did

come down in its natural state, unimpaired and undiminished, to the lower proprietor. But if the upper reaches of the stream should become thickly inhabited, and each and all of the various riparian owners along that stream should exercise riparian rights upon it, where, in the olden days, none had been exercised at all, this exercise of riparian rights on the upper parts of the stream by numerous inhabitants would, in all instances, diminish the flow which had been wont to come to the lower proprietor, and would, in many instances, entirely annihilate the flow that had formerly come to him. This very situation is illustrated in the case of *Clark vs. Allaman*, which we have already discussed.

At common law, then, the only claim for relief, which the lower proprietor could assert, under his "vested right" to the flow of the stream, must grow out of an abuse by the upper proprietor of *his* rights. It must result from an excessive or wasteful use by the upper proprietor. Only in the event of such abuse of right, or excessive or wasteful use, would the lower riparian proprietor have any remedy or right to relief.

This contention, however, as to priority of time giving priority of right, at once suggests the doctrine which does exist in Colorado, and which has features which distinguish it from the common law as to relative rights of individual riparian owners. It is the doctrine of Colorado, as in most of the arid states, that the principle that he is first in right who is first in time applies to those who use the waters of a stream, irrespective of the point along the stream at which such use shall be made; provided, always, that

the water so utilized is applied to some beneficial purpose. And, as we have already suggested, statutes, following customs based upon the necessities of men, have fixed the relative rank of these beneficial uses.

Colorado has, of course, the right within her own borders to make such modification or change in the common law relations and rights of riparian proprietors as she shall deem proper.

U. S. vs. Rio Grande Irrigation Co., 174 U. S., 690.

Gutierres vs. Albuquerque Land Co., 188 U. S., 545.

In this case there is no evidence of any private right along the banks of the river in Kansas having originated prior to 1870. There is no evidence of any beneficial use being made of the waters of the river in Kansas, even by early settlers, until many years after the policy of Colorado, following previously established customs, had crystallized into the form of Constitution and laws.

Now, long before 1870, and at a time when the public domain included practically all of the lands along the Arkansas river in both Colorado and Kansas, the necessities of the people of the arid region had been recognized by national legislation, including the Act of July 26th, 1866, which has been so frequently discussed before this court. And this legislation has been held by this court not to be the crea-

tion of new rights among the people *inter sese,* so much as a recognition of existing rights.

Broder vs. Water Co., 101 U. S., 274, 276.

U. S. vs. Rio Grande Irrigation Co., 174 U. S., 690, 704.

Gutierres vs. Albuquerque Land Co., 188 U. S., 545, 553.

Previous to the enactment of the statute above mentioned the subject of the rules and regulations of miners resulting from conditions in the West, had been the subject of a good deal of public comment, and Senator Stewart, of Nevada, wrote a letter to his fellow senator, Mr. Ramsey, of Minnesota, which has been deemed of sufficient importance to be published as an appendix to the original edition of 3 Wallace, in the reports of this court, on account of its relation to subjects discussed in the case of *Sparrow vs. Strong,* 3 Wallace, 97. In the statement of that case, apparently made by the court, after some allusion to legislation in Nevada, this language is used:

> "Independently of this, however, a special kind of law—a sort of common law of the miners, the offspring of a nation's irrepressible march, lawless in some senses, yet clothed with dignity by a conception of the immense social results mingled with the fortunes of these bold investigators—had sprung up on our Pacific coast; and present, in the value of a 'mining right,' a novel and peculiar question of jurisdiction for this court."

In Senator Stewart's letter, written prior to the Act of July 26th, 1866, we find the following language:

> "A series of wise judicial decisions moulded these regulations and customs into a comprehensive system of common law, embracing not only mining law (properly speaking), but also regulating the use of water for mining purposes. The same system has spread over all the interior states and territories where mines have been found, as far east as the Missouri river."

Again, Senator Stewart says:

> "I assert, and no one familiar with the subject will question the fact, that the sand plains, alkaline deserts and dreary mountains of rocks and sage brush of the great interior would have been as worthless today as when they were marked by geographers as the Great American desert, but for this system of free mining fostered by our neglect, and matured and perfected by our generous inaction."

3 Wallace, 778, 779.

This court has applied these rules, growing out of long custom arising from the necessities of the people, in considering the grazing of public lands.

Buford vs. Houtz, 133 U. S., 320.

In view of the natural conditions existing within the State of Kansas at the time that state was cre-

ated, and in the territory west of Kansas, which had been included in the previous territory of Kansas, the question arises as to whether both Kansas and the settlers within her borders have not, from the beginning of such settlements, acquired their rights on the interstate stream, *subject* to such laws as the inhabitants of the territory along the upper stream should adopt, at least insofar as such laws grow out of necessities imposed upon the people by the natural physical conditions of the country.

In the case of *Clark vs. Allaman,* the opinion was rendered in April, 1905, when the particular case now at bar had been pending in this court for nearly four years, and in the discussion of the march of the common law, the Supreme Court of Kansas, although the case before it referred but to a few acres of land on Rose creek, in Kansas, finds it expedient to call attention to the fact that the *territory* of Kansas, over which this common law extended, had boundaries which included all of the present State of Kansas, and a considerable portion of the present State of Colorado besides. Now, the lawmakers of Kansas, and its people, must be presumed to know, when asserting rights upon the Arkansas river, that the Arkansas river came from the Rocky mountains; that it flowed through an arid territory; that before it reached the humid portion of Kansas it passed through what had been known for years as the Great American desert. These were physical facts open to observation, and which they were presumed to know. We may even go further and say that they were presumed to know certain facts of history; that in all arid countries where civilized life prevailed, the irrigation of lands and the utilization of waters of

streams for that purpose had also prevailed, and that it was essential to civilized life in such countries that that practice should prevail; that from the earliest ages in portions of the arid country west of them the inhabitants had so utilized the waters that traversed their territory. The lawmakers of Kansas, and its people, were bound to know that, as states west of Kansas were formed, and especially out of what had been common territory, the inhabitants of such territory would make laws; that, following the example of Kansas and the older states, they would make such modifications or changes in the common law, as their soil and climate—in other words, their necessities—should require, and that if they found within their territory land and water, which separated were useless to humanity, but combined by the process of irrigation, were capable of sustaining a large population, and creating a great and rich state, that such elements would be utilized for the sustenance of the inhabitants. Now, under any rule of priority of time in the mere settlement along the lower parts of a stream, can it be said that such settlement created rights which would prevent the proper utilization of the upper portions of the stream according to the necessities of the inhabitants living upon its borders, or in the valleys watered by it, when those valleys should become filled with a large population?

We respectfully submit that, independent of any statutory recognition or any judicial utterance, but resting upon natural physical conditions alone, coupled with the progress of growth in the way of peopling the western United States, every settler upon the banks of an interstate stream which flowed

to him through arid lands above, took his rights upon that stream subject to the effect of such laws, as the state controlling the upper reaches of the stream had made or should make, reasonably arising from the necessities of its people as occasioned by natural physical conditions.

This court takes judicial notice of the geography, topography and general conditions of soil and climate in the territory under its jurisdiction. It also takes judicial notice of the laws of the several states and of their development out of the necessities of the people. It must recognize the rule that, under our system of government, each state has the right and the duty to make such laws as the needs of its people require, as to the utilization of natural resources within its own territory. This right must include the regulation of the use of flowing water while such water is passing through the state, from the time of its origin in or entrance into the state until its departure therefrom.

Now, under the principles of the common law, out of which has developed the doctrine of riparian rights, as between individuals, it has always been the rule that the lower riparian holder was only entitled to so much of the flow as should come to him after satisfying the *necessary* uses of upper riparian owners. And the multiplication of inhabitants, with resultant increase of use on the upper stream, would inevitably, and of right, diminish and might entirely extinguish the flow to the lower proprietor, which he had formerly enjoyed in abundance and from time immemorial.

From these principles, we suggest, may be extracted the true rule which should apply between states in their control of an interstate stream, and that is: That the upper state, by natural right, as a result of its position, may by reasonable laws authorize and regulate the use of its waters in such way as to meet the necessities of its people as they arise, and in so doing it invades no right of the lower state.

Just as the lower individual riparian proprietor holds his rights subject to the increasing consumption of the water above by the necessary uses of a growing population along the banks of the stream, so a lower state on an interstate stream holds its rights subject to the reasonable and increasing necessities of the state above, which first receives the waters of that stream.

We have already called attention to a recent utterance by this court:

> "The rights of a *riparian owner* in and to the use of the water flowing by his land, *are not the same* in the arid and mountainous states of the west that they are in the states of the east."
>
> Clark vs. Nash, 198 U. S., 361, 370.

The distinction as to rights which is recognized by this statement does not originate with the statement; it has existed from the first settlement along the waters of the Arkansas river, and being the law now, it was the law then, because it rests upon natural conditions.

We unhesitatingly contend that on a stream like the Arkansas, rising in the Rocky mountains, de-

scending to the plains, passing through an arid and then a practically desert country, and then entering a humid territory and taking its course through different political jurisdictions, the rights of riparian holders in the humid country to the continuity of undiminished flow of that stream were acquired *subject* to the necessary uses of the inhabitants along the stream in the arid territory from which it came. It must be that the jurisdiction over the land along the upper reaches of the stream includes jurisdiction *while it is there* of the water flowing over those lands. This does not suggest the existence of either the right or the power to permanently retain the waters of the stream, or to forever prevent its flow into the state below. That would be an impossibility in fact, and would be contrary to nature if possible, "for water is a movable, wandering thing, and must of necessity continue common by the law of nature, so that I can only have a temporary, transient, usufructuary property therein." (2 Blackstone, 18.)

As water, however, is an element essential to the life of man and beast, and essential to the growth of vegetation, which furnishes the food for man and beast, the necessity in an arid country of utilizing the stream for the sustenance of the people is so apparent, that the ordinary riparian rights of lower proprietors in a humid country, by the very laws of nature, must yield to those preferred rights which grow out of necessity, in the arid region whence the stream comes.

XIX.

CONCLUDING SUGGESTIONS.

The Kansas doctrine as to rights of riparian owners as stated in the Kansas brief has already been quoted, but for the purpose of contrast it should be quoted again. It is as follows:

The lower riparian owner "may compel upper riparian owners to leave the flood go by him unpolluted, unimpaired and undiminished, without making any use whatever of it himself. He has a right to stand upon the bank and see the stream, as it was accustomed to run, if he never dips a foot in it, drinks from it, or makes any beneficial use whatever." (Pl. Br., 221.)

The Colorado doctrine is expressed in the fourteenth paragraph of our second defense. (Rec., page 88.) It may be condensed as follows:

Colorado has the right, for the development of the country, and the support of its inhabitants, to apply the waters of the Arkansas river within the borders of Colorado to beneficial and necessary uses upon those lands which are situated within the valley and drainage of the Arkansas river, returning the said waters after such use to the extent of any surplus remaining from such use into the channel of the Arkansas river.

We ask the court to consider these two doctrines, that which Kansas states as her own, that which Colorado states for herself. We willingly submit to this tribunal the question of the relative merits of these two doctrines, as affecting an interstate stream of the importance of the Arkansas, and whose waters

are essential to the well being of so many people, at least along the upper reaches of the stream.

We recognize in full the maxim that one should use his own in such a way as not to injure another. (*Sic utere tuo ut alienum non laedas.*) We recognize this as a maxim which should be considered in the relations of states to each other, as well as in the relations of individuals between themselves, but there is a correlative rule of the law which is to be taken in connection with this maxim. It is that he who is rightly using his own is injuring no one. (*Qui jure suo utitur neminem laedit.*)

In view of the evidence in this case, as to what has been done, is being wrought, and what is probable in the future, and in view of the legal principles which should determine the rights of parties, we respectfully claim that the State of Colorado, while acting in accordance with the last rule above cited, has not done, is not doing, and is not threatening to do anything which in the slightest degree violates the other maxim quoted.

We have deemed it unnecessary, in the present aspect of this case, to discuss the extent of exclusive sovereign control possessed by the State of Colorado.

The Supreme Court of Massachusetts, speaking through Holmes, J., now a member of this court, once said:

> "Of course the laws of Rhode Island can not subject Massachusetts land to a servitude, and, apart from any constitutional considerations, if there are any, which we do not mean to intimate, Massachusetts might prohibit

the creation of such servitudes. So it might authorize *any* acts to be done *within its limits, however injurious to lands or persons outside them.* But it does not do either."

Mannville Co. vs. Worcester, 138 Mass., 89, 90.

While Colorado might, perhaps, with impunity, authorize any acts to be done within her limits, "however injurious to lands or persons outside them," the fact is that she does not authorize such injurious acts; and the evidence in the present case shows clearly that no such question is presented for the consideration of this court.

In our first defense to the amended bill we have said:

> "The use of the waters of said stream, by diversion thereof and application of the same upon the lands in the valley of said river within the territorial limits of the State of Colorado, is essential to the life and well being of the inhabitants of said valley in Colorado, and the right of continued use of the said waters is as vital to said inhabitants as is the land on which they dwell."

It is the right to protect and preserve this necessary and legitimate use, upon which the life of our people depends, that we insist can not rightfully be taken from us by any decree.

It is unquestionably true that the States of Kansas and Colorado can not go to war concerning their

relative claims. Those are wise and salutary provisions of our national Constitution which restrain the states from war, and which provide that controversies between states shall be submitted to this high tribunal. Any state, indeed, may bring before this court any controversy it chooses to urge as against a sister state, but it is for this court to determine, when such complaint is presented, whether the matters in controversy are of a character for judicial determination, whether they involve any principle which this court may announce as controlling both of the litigants, and whether the facts presented are of such magnitude and of such character as in themselves to justly invoke the interposition of this court for their settlement.

When this cause was before this court upon the demurrer to the original bill, the court very wisely refrained from any decision as to legal or other rights of the parties, other than the right to have the controversy presented here, until the court could, after proofs taken, consider "the circumstances, a variation in which might induce the court to either grant, modify or deny the relief sought, or any part thereof."

The evidence is now before the court, with the views of parties as to its effect, and with their views as to legal rights in relation to the matters in controversy, and we can not do better than to appeal to the latest and very recent utterance of this court in a like case, as expressing some of the principles which we may justly assume will be applied in the case at bar. In the case of *Missouri vs. Illinois,* 26 Supreme Ct. Rep., 268, this court, referring to its rulings upon the demurrer to the bill in that case, said:

"The only question presented was whether, as between the states of the Union, this court was competent to deal with a situation which, if it arose between independent sovereignties, might lead to war. Whatever differences of opinion there might be upon matters of detail, the jurisdiction and authority of this court to deal with such a case as that is not open to doubt. But the evidence now is in, the actual facts have required for their establishment the most ingenious experiments, and for their interpretation the most subtle speculations of modern science, and therefore it becomes necessary at the present stage to consider somewhat more nicely than heretofore how the evidence in it is to be approached.

* * * * *

"In the case at bar, whether congress could act or not, there is no suggestion that it has forbidden the action of Illinois. The only ground on which that state's conduct can be called in question is one which must be implied from the words of the Constitution. The Constitution extends the judicial power of the United States to controversies between two or more states, and between a state and citizens of another state, and gives this court original jurisdiction in cases in which a state shall be a party. Therefore, if one state raises a controversy with another, this court must determine whether there is any principle of law, and, if any, what, on

which the plaintiff can recover. But the fact that this court must decide does not mean, of course, that it takes the place of a legislature. * * *

"If we suppose a case which did not fall within the power of congress to regulate, the result of a declaration of rights by this court would be irrevocable by any power except that of this court to reverse its own decision, an amendment of the Constitution, or possibly an agreement between the states, sanctioned by the legislature of the United States."

The court cites illustrations which would involve possibly a difference in the application of legal doctrines to controversies between states from what would be the rule as between individuals, "but simply to illustrate the great and serious caution with which it is necessary to approach the question whether a case is proved."

And after speaking of the possibility of a nuisance on a navigable river like the Danube, which would amount to a *casus belli*, for a state lower down, unless removed, and after suggesting that under our system a like controversy between states would be settled by the more peaceable means of a suit in this court, the opinion further says:

"But it does not follow that every matter which would warrant a resort to equity by

one citizen against another in the same jurisdiction, equally would warrant an interference by this court with the action of a state. It hardly can be that we should be justified in declaring statutes ordaining such action void in every instance where the Circuit Court might intervene in a private suit, upon no other ground than analogy to some selected system of municipal law, and the fact that we have jurisdiction over controversies between states. * * *

"Before this court ought to intervene the case should be of serious magnitude, clearly and fully proved, and the principle to be applied should be one which the court is prepared deliberately to maintain against all considerations on the other side. * * *

"Even in cases between individuals, *some consideration is given to the practical course of events.*"

In the light of these principles, as applied to the facts of the present controversy, we confidently contend that the case presented by the complainant is not such as to invoke the favorable consideration of this court. And we believe that upon a review of the facts this court must say, substantially as it did in the opinion above cited, that the case proved falls so far below the allegations of the amended bill that it is not

brought within the principles invoked thereby, and that the bill of the complainant should be dismissed.

Respectfully submitted,

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FILE COPY.

In the Supreme Court of the United States.

Orig'l.

T. 1906

No. 8 *Original.*

Office Supreme Court U. S.
FILED
APR 18 1906
JAMES H. McKENNEY,
Clerk.

THE STATE OF KANSAS, COMPLAINANT,

vs.

THE STATE OF COLORADO, THE ARKANSAS VALLEY SUGAR BEET AND IRRIGATED LAND COMPANY, ET AL., DEFENDANTS.

SEPARATE BRIEF OF THE ARKANSAS VALLEY SUGAR BEET AND IRRIGATED LAND COMPANY, ONE OF THE DEFENDANTS, TO THE AMENDED BILL OF COMPLAINT OF THE STATE OF KANSAS.

PLATT ROGERS,
JOHN F. SHAFROTH,
FRANK E. GREGG,
Solicitors of The Arkansas Valley Sugar Beet and Irrigated Land Company.

THE SMITH-BROOKS PRESS, DENVER

In the Supreme Court of the United States.

No. 7, Original.

THE STATE OF KANSAS, COMPLAINANT,

vs.

THE STATE OF COLORADO, THE ARKANSAS VALLEY SUGAR BEET AND IRRIGATED LAND COMPANY, ET AL., DEFENDANTS.

SEPARATE BRIEF OF THE ARKANSAS VALLEY SUGAR BEET AND IRRIGATED LAND COMPANY, ONE OF THE DEFENDANTS, TO THE AMENDED BILL OF COMPLAINT OF THE STATE OF KANSAS.

THE CANALS OF THIS DEFENDANT DIVERT AND USE WATER IN ACCORDANCE WITH THE LAWS AND PRACTICE OF KANSAS, AND KANSAS IS NOT ENTITLED TO COMPLAIN.

In the brief of counsel for Kansas, from page 106 to page 112, is an enumeration of the ditches and canals constructed in western Kansas from 1879 to 1890, with a statement that they would irrigate 245,-

000 acres. These are the ditches in behalf of which this action was instituted. Out of this enumeration is omitted the Amity Canal of this defendant, which differs from those mentioned only in the fact that its headgate is across the line in Colorado. To the extent of thirty miles of its length, it is as much a Kansas enterprise as those named. Its situation is practically the same as The Frontier Ditch, which commences in Colorado, with its headgate 3,300 feet west of the state line, and which is mentioned as one of the ditches which should be protected by this proceeding. It needs no argument to show that the physical and climatic conditions which gave occasion for the building of the exclusively Kansas ditches, also gave occasion for the building of the inter-state ditch of this defendant, as well as the other ditches in eastern Colorado. Wherein lies the distinction in legal standing between these Kansas ditches and this inter-state ditch, or the ditches constructed and operated exclusively in Colorado? If the Kansas ditches may irrigate 245,000 acres of land, as stated by counsel, at page 109, why may not ditches in Colorado irrigate the 300,000 acres which, at page 123, he says were irrigated in Colorado in 1902? These are questions which must be answered before the headgate of the Amity can be closed and the headgates of the ditches in Kansas be left open. If we accept the figures of counsel as correct, the real issue in this case would seem to be whether the riparian owners in the lower part of the Arkansas Valley may be deprived of water by the irrigation of 245,000 acres of land in western Kansas, rather than by the irrigation of 300,000 acres in Colorado. Now, it must be evident from the testimony, as produced by Kansas, that in

that state, the same practice with respect to the use of water for irrigation prevailed as early as 1879, as then pervailed and now prevails in Colorado. The one hundredth meridian was practically the beginning of the area of aridity requiring irrigation, and the practice of diverting water from natural streams was necessarily adopted by the people of Kansas in accordance with the customs and usages prevailing in the arid region. They made those customs and usages a part of the law of Kansas. If not, then this elaborate system of canals in Kansas was built in violation of law, and in defiance of the rights of the State of Kansas. That state has just as much right to have the ditches in its own territory closed by the process of its own courts or its own executive power as it has to have the ditches of Colorado closed by the process of this court, or the executive power of the federal government. We shall aim to show that Kansas is not entitled to relief against this defendant if the ditches in western Kansas are entitled by usage, custom, statute or consent of the state, to operate. We do not intend to discuss the right of riparian owners in this connection. So far as they are concerned, they have either not suffered damage, or they are estopped by laches, limitation or otherwise, from demanding injunctive relief of any character. We are now considering the position which the state occupies, either in its sovereign or proprietary capacity, in demanding that we shall not do what it permits to be done by ditches located exclusively within its own territory. The position which the Amity ditch occupies in this controversy may be better understood by a brief narrative, as gleaned from the testimony, of the develop-

ment of the Arkansas Valley in western Kansas and eastern Colorado.

In the early eighties it was thought that the area of rainfall sufficient for the growing of crops had moved so far westward that land in western Kansas and eastern Colorado could be successfully cultivated. Excepting the land granted to the Santa Fe railroad, the country was substantially still a part of the public domain, subject to the land laws of the United States. Large areas of land north and south of the Arkansas, and in both state, were filed on, and eventually patents obtained. The political divisions of Kansas and Colorado were not factors in the settlement. The movement was on the public domain irrespective of states, counties or natural streams, and the settlers were there rather as citizens of the United States than as citizens of either Kansas or Colorado. Within a few years it was found that the supposed westward movement of the rain belt was but a cycle of rainfall, and that having spent its course, the country was once more returning to its arid condition. Then it was that the people became convinced that irrigation was a necessity. There was no reason on their part to believe that irrigation was unlawful, or that it could be complained of by either the state, or by riparian owners since, as shown by the testimony, the present system of irrigation in Kansas began in 1879. (See brief of counsel, page 184, Fact 6.) It was, however, apparently deemed important that the state should confirm and authorize the practice by some legislative declaration. It may have been thought that the large expenditures required in irrigation development would not be made unless the right to divert the waters of the natural streams received legislative ap-

proval. In any event, it is apparent that it was proposed to assure the people who had taken up lands in western Kansas that it was lawful to divert and carry water for the irrigation thereof. Therefore the legislature of Kansas, in 1886, passed an act declaring that "the right to the use of running water flowing in a river or stream in this state, for the purposes of irrigation, may be acquired by appropriation." And that "as between appropriators, the first in time is first in right." General Statutes of Kansas, 1889, section 3516 This general declaration is the same in effect, if not in words, as that which is contained in the Constitution and statutes of the several states in the arid west. Whatever further provisions may be adopted are simply in furtherance of this general principle. We think it fair to assume that this legislation was intended to authorize the diversion of water to irrigate every acre in Kansas requiring irrigation that might be reached by any canal, wherever built, and that the land abutting on the Kansas-Colorado line was as much entitled to water as the land more remote from the line. It was so assumed by the promoters of the Amity canal. To irrigate the land in Kansas next to the Colorado line it became necessary to divert and carry the water for many miles through Colorado. The Amity canal was, therefore, designed, and finally constructed, to irrigate land on both sides of the line, which had been mistakenly taken up as rainbelt land; the canal as constructed, being eighty miles in Colorado, and thirty miles in Kansas. Following this, and with the intention of extending the ditch through the counties of Hamilton, Kearney, Finney and Gray, the owners of this canal acquired title to 105,000 acres in the counties named, lying under the proposed ex-

tension. But it was found that the supply of water was inadequate for this extensive system. Thereupon, in 1896, the owners of the Amity undertook the construction of a series of reservoirs in which flood and storm waters might be stored for use practically on these Kansas lands. Special efforts were made to secure suitable sites in Kansas, so that the water might be stored near the place of use, but they were unavailing. The only sites at all adequate were in Colorado, and to utilize them a new canal was required, taking water from the Arkansas many miles above the headgate of the Amity. An additional expenditure of over five hundred thousand dollars was required to obtain these reservoir advantages; the inducement to the expenditure being the ultimate reclamation of Kansas lands, rather than Colorado lands. In 1891, and preliminary to this latter investment, the Kansas legislature adopted additional legislation concerning the use of water, and declared that

> "west of the 99th meridian, all natural waters, whether standing of running, and whether surface or subterranean, shall be devoted, First, to the purposes of irrigation in aid of agriculture, subject to ordinary domestic uses; and, second, to other industrial purposes, and may be diverted from natural beds, basins and channels for such purposes and use."

In connection with the foregoing, it also authorized the creation of irrigation districts and the selling of bonds of said districts to obtain the money necessary to build ditches, said bonds to be secured by the ditches, water rights and lands to be irrigated.

It would certainly seem that this legislation effectually concluded the State of Kansas from claiming an interest in the Arkansas river contrary to the use which this defendant and others had made of the waters of that stream. It would be just as fair and reasonable for Kansas to attempt to destroy the water rights upon which bonds have been or may be issued, under its authority, as to insist that the waters of the Arkansas river can not be taken by ditches in Colorado for Kansas lands, or, for that matter, for lands in either state. It must be apparent, upon a consideration of this case, that what Kansas did when it adopted the acts of 1886 and 1891, was merely to declare that where aridity prevails, there irrigation may be practiced. It concurred with the other states in the arid region in respect to what the law should be in the use of natural streams. In other words, it removed any possible difference in the laws of Kansas and Colorado with respect to the Arkansas river or other streams in which they might be mutually concerned, and in effect declared that there should be no controversy between the two states over the subject. If we treat the Arkansas as a stream in which both states are interested, and their laws are in agreement as to how its waters should be used, how is it possible for a controversy to arise? It is not contended that because states adopt similar action respecting subjects of common concern, they are, therefore, bound by a compact; but it is insisted that where controversies arise between them concerning such common subjects their respective methods of disposing of them may properly be referred to, and if found to be in agreement, it may be declared that no controversy exists, or that the same practice which

they have adopted should be adopted by the court as the proper rule of decision. Indeed, it seems unnecessary to go so far as this, since Kansas makes the right to irrigate land in the western part of the state a substantial part of its cause of action. It does not leave the effect of its laws and customs doubtful, but plants itself squarely upon the validity of acts performed in harmony with those laws and customs. It justifies and confirms the rights of its appropriators, leaving for determination only, the question of priority of right as between them and appropriators in Colorado.

CONFLICTING APPROPRIATIONS CAN NOT BE SETTLED IN THIS PROCEEDING.

In a former brief Kansas said it was no concern of ours what it did with the water after it obtained it. That was when the sole ground upon which it claimed it was the doctrine of riparian rights, as it interprets that doctrine, and when the State of Colorado was the sole defendant. The error of this claim we will notice later. It is sufficient now to say that, as stated by counsel on page 6, it also sues in behalf of those, who in western Kansas appropriated and used the waters of the Arkansas river for surface irrigation, to supplement the scanty rainfall of that region, and that the defendants, against whom relief is demanded, are the individuals, of whom this defendant is one, who have taken water in priority to the Kansas ditches. The case is, therefore, squarely one where Kansas affirms the right of its own irrigators and suggests to this court the adoption of its own laws in respect to irrigation as right and

proper. It can not complain if this court accepts its suggestion. The sole remaining question in this connection is whether this is the appropriate proceeding and this the appropriate tribunal for determining conflicting claims to water by appropriation. We have heretofore suggested, by appropriate motions and briefs in support thereof, that as respects conflicts between the appropriators in Colorado and the appropriators in Kansas, as well as the riparian owners in Kansas, this court has no jurisdiction and we think the point well taken. Appropriations have no common history. Each depends upon its own particular circumstances of time, place, amount and use. The appropriators in Colorado are, by the very nature of the subject, in frequent conflict as to which is prior in time and as to the amount to which each is entitled. In the brief of counsel at page 106, et seq., it appears that the ditches in Kansas were constructed at different times, from 1879 to 1890. If they follow their own law of awarding rights to water in the order and time of appropriation, these ditches will not have a common date of appropriation, consequently, if the ditches in Colorado are entitled to the benefit of similar laws, and the laws of Colorado are similar, some of the Colorado ditches may be prior to *all* of the Kansas ditches, and others may be prior to *some* of the Kansas ditches. At page 110 the priorities of the Garden City ditches are tabulated, the first ditch being of date November 8, 1879, and the last ditch of date November 29, 1887, and at page 115, et seq., the priorities of the Colorado ditches represented in this case are set forth, in which, without tabulating them, it will be noticed that appropriations were made in

the following years: 1867-1869-1874-1875-1877-1884-1885-1886-1887-1889-1890-1891. It must be evident that, by the laws of Kansas, many of the Colorado ditches will be prior to all the Kansas ditches and that as to the remainder, they will be interwoven with them. But a tabulation of the Kansas and Colorado ditches, as shown by the evidence, would not dispose of the equities of the parties. Many of the Colorado ditches claim that certain of the Kansas ditches are barred from maintaining their alleged priorities by reason of equitable facts, laches, limitation and adverse user. The issue between ditches in Colorado has always been a separate and distinct controversy and presumably the same is true in Kansas. How, then, can all these dissimilar controversies be bunched in one? Does the fact that one group of appropriators is east of the Colorado-Kansas line and one group west, enable the former to make common cause and require of the latter common defense? Is this object removed by the *parens patriae* of the Kansas ditches, instituting an original proceeding in this court on their behalf? That the individual defendants should not have been joined in this proceeding is made clear by the views of this court in

Budford vs. Hautz, 133 U. S., 325,

where it is said:

> "The bill as against the individual defendants ought not to be sustained because it unites a large number of defendants to restrain them from committing a trespass, where if they were guilty or should attempt to commit a trespass, they do it without con-

> cert of action, at different times, and in different parts of a large district of country, each in his own way and by his own action."

If this proceeding were intended to ascertain and establish the relative priorities of ditches in Kansas and Colorado, then this court must enter individual decrees, that is, it must say that certain Colorado ditches have priorities antedating 1879, or whatever may be the year of the first ditch in Kansas, and then a certain Kansas ditch has priority as of a certain date, and then a Colorado ditch has priority of a certain date, and so on to the youngest appropriations made. Meanwhile, none of the owners of ditches in Kansas have been parties, nor have they been heard, and their rights, if any they have, must, in their absence, be established in the name of Kansas. So far, therefore, as this proceeding founds the right of Kansas upon the irrigation rights of the appropriators of western Kansas, it seems to us it must fail. We beg to refer to the brief heretofore filed in support of our motion to dismiss, for a somewhat fuller statement of the law in this connection.

THE COMMON-LAW DOCTRINE OF RIPARIAN RIGHTS AS APPLIED TO KANSAS AND COLORADO.

The anomaly of asserting in the same proceeding a cause of action upon behalf of the irrigators in western Kansas and also upon behalf of the riparian owners in eastern Kansas, has been noted and fully commented on in the brief of the State of Colorado.

We desire to add a word in this connection. By the principles of international law a state must, in seeking adjustment of controversies, show that it represents and maintains an interest common to all its citizens. It can not ask a determination of the divergent interests of its own citizens. Either Kansas stands for the doctrine of riparian rights, as its counsel announces that doctrine, or it stands for the doctrine of appropriation to beneficial uses. It can not stand for both, as the one is destructive of the other. The answer which Kansas gave to Colorado, that it was none of the latter's business what it did with the water, will no longer avail. It now asks of this court whether it is not entitled to use the water for irrigation purposes in priority to a like use in Colorado. It confesses the applicability of the doctrine of use by appropriation and seeks to establish its relative position as an entirety, or at least the relative position of several appropriators, whom it assumes to represent as against appropriators in Colorado. Again it relies upon a peculiar doctrine of riparian rights, which its counsel have discovered. It is assumed that in this day and in this country of constant change the law is inflexible; that whatever it was in England two hundred or more years ago, it is to-day, and that it undergoes no change in being transferred from a humid to a dry country, from a temperate to a tropic zone, or from a closely settled to a sparsely settled country. The present brief somewhat abbreviates the very interesting history of the common-law doctrine of riparian rights as it journeyed westward with the settlement of the country and finally located itself over the Territory of Kansas, as detailed in the original Kansas brief. Nevertheless, reliance is still

placed upon the fact that when lodged in Kansas, it was without qualification, that is, it was not influenced or changed by the wants of the people. By this is meant that in adopting the common law, the territorial legislature did not say it was adopted as modified by the conditions and wants of the people, as was afterward done by the state legislature. Now, the course of decision in this country has been so uniform to the effect that such a qualification is always understood and is to be deemed written in the act of adoption by judicial construction, that we feel it unnecessary to cite authorities other than the decisions of this court. Whatever in the common law is inapplicable, whatever does not fit, never fastens itself upon us by any form of words, much less by the omission of words. In

Buford vs. Hautz, 133 U. S., 325,

this court refused to apply the rules of the common law concerning enclosures. The point was whether they should obtain where the conditions and wants of the people made them inapplicable and in discussing it, the principle for which we now contend was laid down. The opinion is very instructive, and its conclusions are fortified by the views of various state courts to the same effect. The inflexibility of the common law, as contended for, is not sustained by English judges, either at home or in the colonies. They invariably make the law bend to local conditions and necessities as well as to the racial, religious and social views of the variety of peoples over whom the

laws of England have been spread. A case most like this of any that can be found is

Martley vs. Carson, 20 Canada Supreme Court Reports, 634.

This case is most persuasive, and should be read in full, but we beg at this time to make the following extract from the opinion:

> "It would be useless to expect that the table lands upon the mountain ranges, stretching through the colony, should ever attract settlers upon them, or that the staple wealth of the colony could ever be worked beneficially if riparian appropriators of the land should be permitted to set up the common law of England against the material interests of the colony. To my mind, the act is infinitely more suited to the conditions of the colony and better calculated to promote the interests of all persons becoming settlers in it than the common law of England, however admirable it may be, and however entitled to the designation of the perfection of wisdom, when applied to the condition of a country like England."

These views were reproduced in the opinion of this court in Clark vs. Nash, 198, U. S., 361.

A very valuable compilation of instances in which courts have refused to apply the common law because of new conditions, occurs in

Katz vs. Walkinshaw, 74 Pac., 766 (Cal.).

Whether the common law as adopted in Kansas met the conditions and wants of the people, could not well be determined until the country had become settled, and its failure to do so could not be better expressed than through the action of the legislature. Therefore, we find that as people moved westward in Kansas they rejected in their practices the alleged doctrines of the common law in respect to the use of water, and the legislature promptly gave expression to their views in the act of 1886 already referred to. But it is intimated that this legislation did not impair the doctrine of riparian rights; that the rights of riparian owners were vested and beyond such impairment. This, however, is not the view of this court. In

Manigault vs. Springs, 199 U. S., 473,

it was held that a state has a right to adopt legislation authorizing the reclamation of land and that the private interests of riparian owners must give way to the larger interest. If the riparian owner has become an actual appropriator, he may have a claim for compensation, but his naked and technical common-law right will not avail. Kansas seems to have had this distinction in view in its several acts, authorizing the diversion of water, as it assumes that it is not required to regard riparian owners as such, but only those who have become actual appropriators, it being only in case of the latter that compensation is required. It certainly has declared that the use of water for irrigation should take precedence of the riparian right of flowage, and has renounced any sovereign or proprietary interest it might might have had in the maintenance of strictly

riparian rights. If this court should now decree that riparian rights should prevail in Kansas to the exclusion of irrigation, which would control in that state, the statutes of Kansas or the judgment of this court?

THE POSITION OF THIS DEFENDANT AT COMMON LAW.

Conceding, for the sake of argument, the adoption of the common law by the legislature of the territory of Kansas without qualification, and that it determines the right of this defendant, it remains to be ascertained what that law is. Upon this point the brief of Colorado is full and complete. It is there shown that the right of riparian owners to the use of the water flowing over or against their land always included a reasonable use of the same for irrigation. This is the rule in a country where irrigation is a convenience and not a necessity. Does it lose any of its efficacy when transferred to a country in which irrigation is a necessity? At common law domestic uses have priority over all other uses, such uses being deemed those necessary to supply natural wants, such as quenching the thirst of man and beast, cooking and for ordinary household purposes. Domestic uses thus include necessary uses, as distinguished from convenient uses. In a humid country the growing of crops is just as much a natural want as quenching the thirst, etc., but it is satisfied by the abundant rainfall which prevails. It is not necessary to remove water from the springs and streams and apply it to the lands. But if the climate should change and

the heavens fail to give the required moisture, it would certainly follow that if the waters of the streams were necessary for the growing of crops, the use of water for that purpose would arise to the dignity of a domestic use. Such we concede to be the case in the arid region. It has been said, over and over again, by the national and state legislatures, by courts, judges, officials of every grade, and by scientists and travelers without number, that in the arid belt of America irrigation is a necessity. The word necessity is used in the sense that without it the country is practically uninhabitable, a verification of which is furnished by the facts appearing in the record concerning the abandonment of highly improved Kansas farms because they could not obtain water for the growing of their crops. It is idle to consider domestic use in an arid country with the limitations impressed upon that term by conditions in a humid country, since a household can not be established in an arid country in the absence of a right to irrigate. Unless in an arid country a domestic use includes supplying all the natural wants of man, both as to food and water, the term is of no value when applied to the use of natural streams. Therefore, it would seem that the common law, when introduced into this part of the world, if intended to be as beneficial as in humid countries, would permit the use of the water for irrigation, either as a general climatic necessity, or as a specific phase of domestic use. The distinction between the common-law use and the use permitted by the doctrine of appropriation, which prevails in the west, would be in the territorial extent of use. Under the former it would be restricted to the lands of a raparian owner, while under the latter

it would be limited only by the extent to which it might physically be carried and applied to land, irrespective of riparian ownership. Of the two doctrines, the latter is founded on universal or national necessity within practically one-third of the national domain, whereas the former is but an enlargement of the incidents of riparian ownership. The situation of this defendant in respect to the application of the common-law doctrine differs from that of most of the other individual defendants. All of the lands under the Buffalo canal, extending several miles along the north side of the Arkansas river, were acquired in one body as riparian lands, more than twenty years ago. The owners of these lands then constructed that canal for the purpose of irrigating them and ever since it has been in constant operation. Under these circumstances, the lands under the Buffalo canal are certainly entitled to water as of common-law right, The same is also true as to much of the land under the Amity canal. It belonged to the owners of that canal and it was in part the purpose in building the canal to reclaim it. The testimony shows that the Amity enterprise has always been a land enterprise rather than an irrigation one, that is, the Buffalo and Amity canals were constructed for the purpose of irrigating land belonging to the owners of the said canals rather than for the purpose of carrying and furnishing water as common carriers. With the sale of each tract of land under these canals, the purchaser has received a fractional interest in the canal serving him with water. The relation of the land to the canals has always been preserved. The history of this enterprise is detailed by Mr. Wiley at pages 1427, et seq., of the record, and the lands in Kansas and Colorado,

as well as the canals covering them, are shown in the exhibits introduced at page 2292. This defendant stands in the attitude of a riparian owner to the Arkansas river, and is entitled to use the waters of that stream to the extent necessary to make the land fruitful, even though a substantial diminution of the stream in Kansas may be caused thereby. Such is the undoubted situation at common law, as set forth in the brief of the State of Colorado. Viewed in this light, the State of Kansas is not entitled, either as a state, or as the representative of riparian owners along the Arkansas in Kansas, to maintain this proceeding.

DEFENDANT DOES NOT DEPRIVE THE RIPARIAN OWNERS IN KANSAS OF WATER DURING THE SEASON WHEN IT IS OF VALUE TO THEIR CROPS.

The Amity system of canals and reservoirs belonging to this defendant is the most elaborate and extensive in the Arkansas valley. The reservoirs have a storage capacity of over a hundred and fifty thousand acre-feet. That is, they hold as much water as spread over one hundred and fifty thousand acres would cover them to a depth of one foot. The water stored in these reservoirs is taken from the river during the flood season of each year, and, to a limited etxent, during the winter. None of the water so taken would, if allowed to pass down, be of the slightest benefit to anyone in Kansas. This water during the irrigating season is added to the water taken directly from the river through the Amity and Buffalo canals and

spread upon about seventeen thousand acres of land. During the winter this land also has spread upon it a large amount of water, diverted directly from the river. Altogether, there is spread upon these seventeen thousand acres during each year, about four feet in depth of water. In the carriage, storage and spreading of water in the various ways adpoted by this defendant, the country has become saturated, just as would be the case if the natural rainfall were equal to the depth of water applied to the land, and as the pores of the earth are filled, the water begins to ooze into dry gulches and other depressions, creating springs and streams which discharge water constantly into the river. Now, the testimony is that of the water carried and applied to land contiguous to and in the drainage basin of a river, about one-third returns to the river by percolation. In the operations of this defendant it appears by the statement of Mr. Wiley at page 1440, that of the total amount of water applied to or spread upon land each year, about one-third is taken from the river at the time of application in the actual growing of crops, that is, during the irrigating season. The water so taken from the river, if not diverted, and allowed to pass down to Kansas, would have lost in volume, by seepage and evaporation, between the headgates of the canals mentioned and the state line, about fifteen per cent. It will thus be seen that by saturating the land each year with water previously stored and by the use of water taken directly from the river during the winter and irrigating seasons, the return waters which find their way into Kansas are equal to the water taken during the crop or irrigating season, that is, during the season

that Kansas claims the water is necessary for sub-irrigation. Of course, this return is continuous through the year and not confined to the irrigating season, but the end is to equalize the flow and to discharge water into Kansas at times during the crop season, when, under natural conditions, as the evidence discloses, there would practically be no water. Upon balancing the natural and artificial conditions, it will be seen that the diversions made by this defendant do not deprive Kansas or any of her citizens of water at the time when it is claimed it is of benefit in the sub-irrigation of their lands.

CONCLUDING REMARKS.

It is the interstate character of the Arkansas river that gives rise to this controversy, and it may be that, aside from any real injury suffered by Kansas, and in view of the possible government development, this court may feel it wise to law down some rules concerning the use of interstate streams. In that event the aim must necessarily be to advance the common welfare, that is, the welfare of the people generally, irrespective of their being citizens of Kansas, Colorado or other states. The natural streams of this country have played a very material part in national development. In the East their importance has measurably declined, principally because of their lessened use for navigation. But in the West their importance is on the increase, principally because they enter into the problem of increasing the area available for homes. In the arid West their value is be-

ginning to be measured almost by drops. The development of that section depends primarily upon such use of water in the irrigation of land as will extend the area of production. It is made clear by the evidence that under the peculiar physical and climatic conditions which prevail, the so-called rivers are themselves large consumers of water. That is, the further water runs over their sandy beds, the greater the loss and the less the amount left for beneficial purposes. If, for instance, it were not permissible to use the waters of the Arkansas river in the irrigation of Colorado land, the amount flowing into Kansas would be less than half of the amount now diverted and used in the former state. Besides this, the greater the distance of the place of use from the mountains, the less the opportunities for storage and other conserving devices, and also the greater the expense of diversion since as the country flattens out and the river broadens, the difficulty and expense of constructing diverting dams are greatly increased. Many witnesses who have made a study of the subject of irrigation have testified that the proper utilization of water for irrigation requires application first upon the lands nearest the source of supply and then following the stream downward. This, of course, must be apparent to anyone who reflects upon the situation. If, therefore, it is the public interest which is to be kept in view in the use of these interstate streams, this court should lay down such principles as will conserve the waters of the Arkansas, rather than dissipate them and render them of but little value. It has been many times judicially declared that where water may be entirely lost in transit by seepage and evaporations between an upper and a lower proprietor, the

former may use it all. This, of course, is founded on the economic objection to the waste of natural resources. The same economic objection exists where, between the upper and the lower user the stream so far diminishes that the service obtainable at the lower point of use is but a fraction of that obtained at the upper. We have always contended that Colorado was entitled to use the waters of the streams heading in its mountains, because nature fixed the lands adjoining the streams in that state as the place upon which water should first be applied. Instead of this rule being a detriment to the lands in Kansas, it will, in the end, prove to be of the highest value, since the irrigation of Colorado lands means that they are converted into great underground reservoirs, eventually furnishing Kansas a sure source of supply. All speculations as to the right of Colorado to stop all the water of the Arkansas river from flowing into Kansas are idle, since Nature is inexorable in compelling water to always flow downward, and it is a physical impossibility for Colorado or any of its citizens to erect barriers to this flow.

In closing, we respectfully call attention to the motions heretofore filed by the individual defendants to dismiss the bill of complaint, a consideration of which was passed until final hearing. The position thus taken was, that if controversies exist in respect to the use of the waters of the Arkansas, they are either between riparian owners in Kansas, or appropriators in Kansas and the individual defendants in Colorado, and not between the State of Kansas and the State of Colorado, or these defendants. The evi-

dence fully sustains our contention as to the character of the controversy, and the motion is still appropriate.

Respectfully submitted,

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